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ABSTRACT

This report examines the availability and distribution of resources for public elementary and secondary schools both among and within states, the District of Columbia, and Puerto Rico. Analyses are presented using data for the 1976-77 school year, with some comparisons to 1969-70 and 1973-74. The available statistical data on public school financial status for states and for school systems in the United States are assembled from diverse sources. An acceptable level of comparability in coverage and definition is achieved by extensive editing; this results in two distinct databases, one containing information at the state level and the other information at the school system level. Using several summary statistics that have been used in previous analyses of the distribution of educational revenues, the study shows dispersions in expenditure, revenue, and teachers throughout the nation's 16,000 school systems. In analyzing wealth neutrality, the authors examine dispersions in property values and in computational tax rates as well as the relationship of property values and tax rates to state and local revenues and to expenditures. (Author/SLP)

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Public School Finance:

Profiles of the States

EA 014 099

Foreword

This statistical report initiates a new biennial series presenting analyses of resources and expenditures for public elementary and secondary education among and within the States, the District of Columbia, and Puerto Rico. Prepared in response to Section 1201, P.L. 95-561, the report reflects the then-active legislative concern that resources available to the Nation's school systems be equal. The analyses go beyond those contained in an earlier publication series by the Center that reviewed expenditure data by local school systems.

The goal of this series is to provide an objective, statistical basis for showing States' progress toward equalization. Accordingly, this report addresses issues of data quality and appropriate measures of resource disparities in addition to presenting extensive data and statistical analyses of aspects of school finance. Data for 1976-77 are analyzed in terms of the distribution of education resources and the relation of those resources to school system wealth.

The report does not present descriptive statistics and analyses assembled separately for each State; instead, State characteristics are considered within a national context. This report differs from those of earlier profiles in that it presents analyses of differences both among and within States in summary form for all States. The presentation of comprehensive data for States is a next step to address in planning the products of this analysis.

Although there have been a number of significant changes among State school finance systems since 1976-77--Proposition 13 in California and the extensive reforms in South Carolina, for example--the data base used in this report contains the most recent and comprehensive data available at the Federal level on school finance among and within the States at the time this study was

initiated. Collecting uniform data from the States for reporting on the status and trends in financing elementary and secondary education among and within the States is an integral part of this analysis project. It has also been mandated by Congress in P.L. 95-561, Section 1201. As this report indicates, data of better quality and, in some cases, different scope are needed. NCES is currently working to improve its collection of school finance data.

The present study is ambitious in both scope and intent. Its limitations have been imposed by data availability and comparability on the one hand and statistical methodology on the other. While the report documents progress in studying the issues, it also emphasizes how much remains to be done. Nevertheless, we hope it will serve education policymakers by offering a substantial, statistical basis within which to consider policy alternatives and serve researchers by sharpening insights and inquiries into school finance issues.

Marie D. Eldridge

Administrator

(NCES)

July 1981

Acknowledgments

Public School Finance: Profiles of the States, 1979 edition, was prepared by the National Center for Education Statistics as part of an extensive project to examine issues related to school finance. Many agency representatives, researchers and scholars have contributed to the project in a variety of ways since its initiation in early 1979. Government representation included the Office of the Assistant Secretary for Planning and Evaluation; the Office of the Assistant Secretary for Education; the National Institute of Education; the Bureau of Elementary and Secondary Education, Office of Education; and the Department's School Finance Project, all from the former U.S. Department of Health, Education, and Welfare. Numerous State education agency representatives also participated in discussions on data availability and study design. The study would have been impossible if NCES had not received considerable cooperation from State agency officials in supplying data and in resolving data problems. Many of the contributions made by these persons have been incorporated into the analysis presented here; others have shaped plans for future studies.

The study on which this report is based was conducted under the overall direction of Victor D. Wenk, Deputy Administrator. Supervision of the study was the responsibility of Leslie J. Silverman, Forrest W. Harrison, Absalom Simms, and Mary A. Golladay. Eugene McLoone, serving with NCES through an Intergovernmental Personnel Act transfer from the University of Maryland, had central responsibility for the development and analysis of study data. Major portions of the analysis and its management were directed by Albert R. Munse, James J. Noell, Nancy-Jane Stubbs, and Larry W. Suter.

Methodological advice was provided by William B. Fetters, Martin M. Frankel, William A. Combs, and Peter Stowe working as a task force, and also by Roslyn Korb, Lee Wolfe and Rolf M. Wulfsberg. Considerable editing of data was done by Albert R. Munse, Gerald Kahn, and Richard H. Barr. The data analysis was conducted primarily by William Sonnenberg. Paul Dunn, Warren Dahlstrom and Joseph Consorti also supported aspects of the analysis. Production support services were supplied by Celeste Loar and Imelda Hodge.

Extensive assistance in preparing data files and in organizing the research activities was provided under contract with American Institutes for Research and their subcontractor, Applied Urbanetics, Inc. Major contributions were made by Lynnette Ferrara, Babette Gutman, and Jay Moskowicz. The edited data files prepared by AUI are now available as a public-use computer tape.

This final report, summarizing results of methodological discussions and data analysis, was the responsibility of Mary Golladay, Eugene McLoone, and William Sonnenberg. NCES staff serving on the internal review group for the report were Martin M. Frankel, Roslyn Korb, Larry W. Suter, and Lee Wolfe. Lance Ferderer provided editorial assistance. Graphics production was the responsibility of Philip Carr and Nancy Young. Extensive typing support was provided by Brenda M. Wade, Barbara A. Jackson, Denise Wood, and Wanda Vaughan.

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EXECUTIVE SUMMARY

This report examines the availability and distribution of resources for public elementary and secondary schools both among and within States, the District of Columbia, and Puerto Rico. Analyses are presented using data for the 1976-77 school year, with some comparisons to 1969-70 and 1973-74. The data and measures shown here address the requirements of P.L. 95-561, which directed the National Center for Education Statistics to publish on a biennial cycle "a composite profile of each State showing the degree to which each has achieved equalization of resources."

Statistical Resources and Methodology

This report was prepared from statistical data on public school financial status for States and for school systems in the United States assembled from diverse sources. The available data were extensively edited to achieve an acceptable level of comparability in coverage and definition in two distinct data bases. One data base contains information at the State level and one at the school system level. A useful product of the study is a thorough set of these school system financial and nonfinancial data on computer tape, now available for public use.

Some factors important to a thorough analysis of cost differences among school systems could not be adequately examined because of severe limitations of the statistical sources. For example, no analysis of personnel differences among systems, other than school teachers, has been presented because of data limitations. Likewise, particular sources of funds could not be related to expenditures because the systems linking local, State and Federal funding sources to school system expenditures are not comparable from State to State.

No attempt has been made to relate the amount of differences in costs per pupil to student outcomes or educational benefits.

Some analyses are limited in scope because of the effects of organizational characteristics on data. Most notably, the analysis of differences among school systems is limited to unified systems, those comprised of both elementary and secondary schools. This restriction has differential effects on the scope of the analysis, depending on States' organizational characteristics. The coverage for 12 States is affected to a considerable extent.

Dispersions in expenditure, revenue and teachers throughout the nation's 16,000 school systems are shown using several summary statistics which have been used in previous analyses of the distribution of educational revenues, such as the 95 to 5 percentile range ratio, the Gini coefficient and the coefficient of variation. This analysis relies heavily on a single summary statistic known as the Theil coefficient, which has not been used in previous analyses of school system finances. This coefficient is used extensively because it possesses more desirable statistical properties than any other measure considered. These properties include the ease with which disparity can be decomposed into components that are of interest, such as the disparity of expenditures within and among States and within and among different classes of school system size. The Theil coefficient also lends itself to comparisons over time and from State to State.

Dispersion in property value and in computational tax rate as well as the relationships of property values and tax rates to State and local revenue and to expenditures are examined using several statistics employed in analyses of wealth neutrality. Correlation coefficients and regression coefficients, used in several studies, are presented to permit comparisons with the results of those studies. This report uses the economic concept of elasticity to evaluate the wealth neutrality of educational resources.

Findings

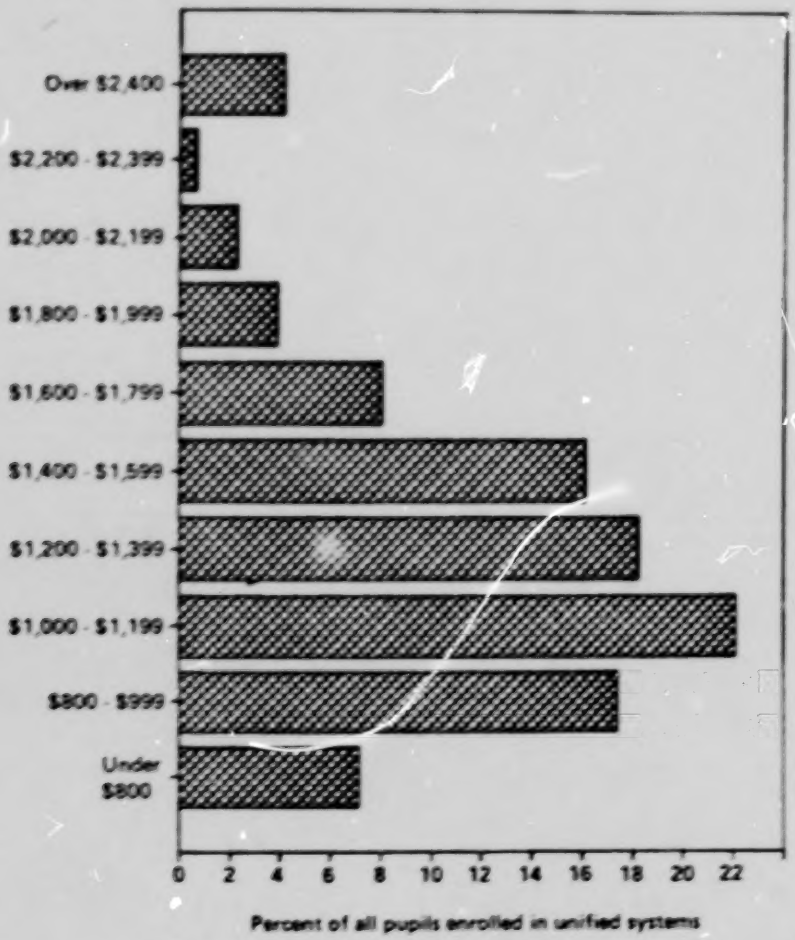
Expenditure Disparities. An examination of per-pupil expenditures for public, elementary-secondary education for school systems throughout the United States shows that per-pupil expenditures vary widely from system to system and from State to State. The distribution of all pupils in the country attending unified school systems by average cost per pupil is shown in chart 1. The range of expenditures per pupil by school system for each State is shown in chart 2.

The among State disparity in expenditures, as measured by the pupil-weighted Theil coefficient, is twice as large as the average within State disparity, that is, 34.9 versus 15.5 (table 1). Differences in school system average expenditure per pupil by school system between States are greater than differences in expenditure per pupil from school system to school system within States. The large State-to-State dispersion motivated the further analysis summarized below.

Several adjustments are made to the figures for core current expenditure per pupil by school systems in order to examine causes of large among State disparity. Adjustments show the importance of cost of living differences among States. The among State disparity reduces from 34.9 to 15.0 when core expenditure is adjusted for State differences in the cost of living, a reduction of almost 60 percent. Adjusting data by excluding retirement and social security payments from expenditure reduces the calculated among State disparity from 34.9 to 27.0, a reduction of slightly more than 30 percent. Combining adjustments for both cost of living and retirement reduces the among State disparity from 34.9 to 11.8, a reduction of almost two-thirds. State level average expenditures also are examined to ascertain the possible influences of several factors on expenditure levels. When several different adjustments to expenditures per pupil on the State data base are tried to account for variations in numbers of pupils having special needs, no appreciable change in State to State dispersions resulted (table 2).

Chart I

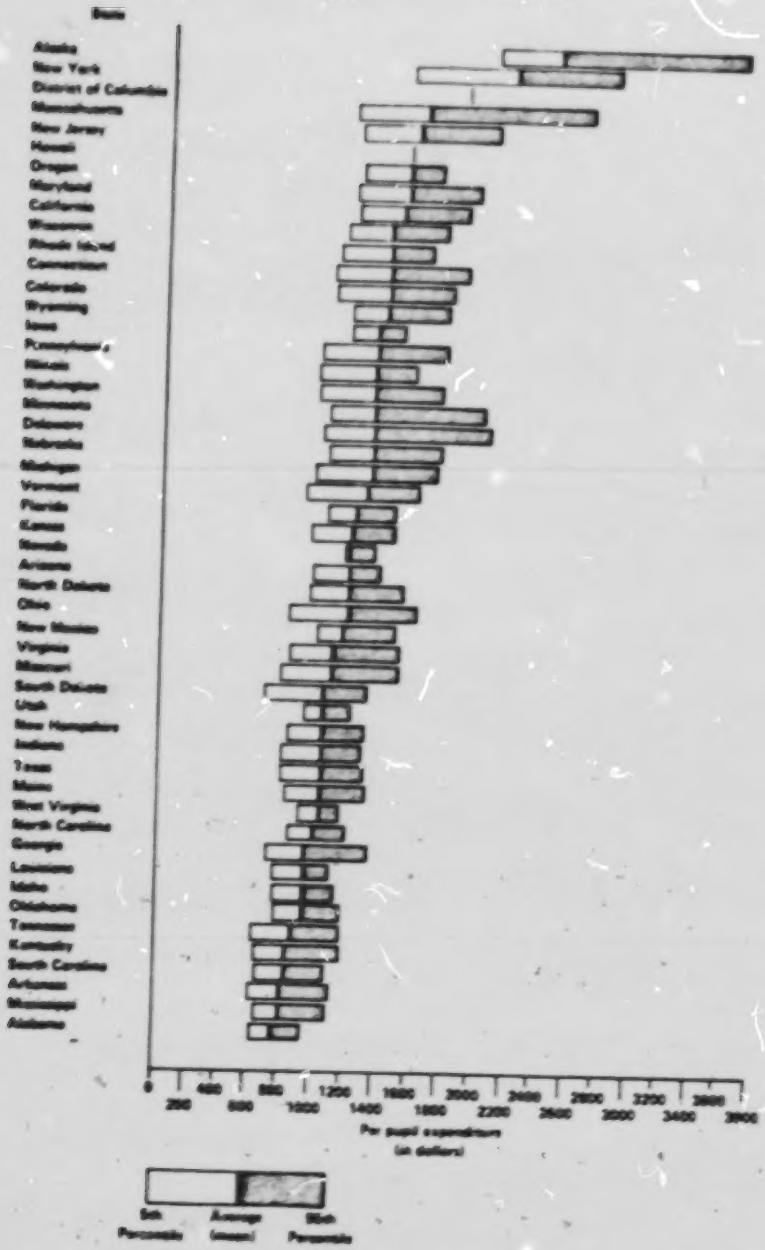
Percent of Pupils, by Core Current Expenditure Per Pupil for Unified School Systems, United States: 1976-77



Source: U.S. Department of Education, National Center for Education Statistics, *Profiles of the States*, 1979 edition, table 3.7.

Chart 2
School System Core Current Education Expenditure Per Pupil, by State
1976-77

(in School Systems with Grades 1-12)



Source: U.S. Department of Education, National Center for Education Statistics, *Public School Finance: Profiles of the States*, 1979 edition, table 3.8.

TABLE 1

EFFECTS OF DATA ADJUSTMENTS TO THE SCHOOL SYSTEM LEVEL DATA BASE ON DISPERSION OF CORE EXPENDITURE PER PUPIL: 1976-77

Core current education expenditure per pupil	Total	Decomposed Theil Coefficient	
		Among State	Within State
Unadjusted Theil Coefficient	50.4	34.9	15.5
Adjusted Theil Coefficient			
Adding State and Intermediate expenditure per pupil to each school system core current expenditure	44.9	30.2	14.6
Excluding all retirement and social security payments	42.3	27.0	15.3
Adjusting for State-to-State cost of living differences	30.6	15.0	15.5
Adjusting for both retirement and cost-of-living differences	27.1	11.8	15.3
Only Salary Expenditure Per Pupil ...	36.1	21.4	14.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Public School Finance: Profiles of the States, 1979 Edition.

TABLE 2

SELECTED MEASURES OF DISPERSION OF CORE CURRENT EDUCATION EXPENDITURE PER PUPIL ADJUSTED1/ FOR PUPILS IN SPECIAL CLASSIFICATIONS, BY STATE
UNITED STATES, 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

MEASURE	VALUE BASED ON PUPILS WEIGHTED AS FOLLOWS: UNDUPLICATED COUNT: REGULAR PUPILS=1.0 HANDICAPPED=2.0 OTHER SPECIAL CLASSIFICATION=1.5	DUPLICATED COUNT: REGULAR PUPILS=1.0 HANDICAPPED =2.0 HANDICAPPED ALSO IDENTIFIED IN ANOTHER SPECIAL CLASSIFICATION=2.5 OTHER SPECIAL CLASSIFICATION NOT HANDICAPPED=1.5	UNDUPLICATED COUNT: REGULAR PUPILS=1.0 ANY SPECIAL CLASSIFICATION PUPIL =1.5
HIGH STATE VALUE	$2140	$2104	$2433
LOW STATE VALUE	8572	8543	8691
RATIO OF HIGH TO LOW STATE VALUE	3.7	3.8	3.5
OUTSIDE 15% ABOVE OR BELOW UNITED STATES AVERAGE			
NUMBER OF STATES	33	32	27
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	62.7	63.7	54.9
UNWEIGHTED			
MEAN (AVERAGE OF STATE AVERAGES)	1013	992	1139
STANDARD DEVIATION	272	237	294
COEFFICIENT OF VARIATION(X100)	26.8	24.9	25.8
WEIGHTED BY PUPILS			
MEAN (UNITED STATES AVERAGE)	1025	999	1166
STANDARD DEVIATION	243	232	262
COEFFICIENT OF VARIATION(X100)	23.7	23.3	22.4
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	26.5	26.7	25.2

1/ STATE AVERAGE CORE CURRENT EXPENDITURE PER PUPIL IS ADJUSTED TO ALLOW FOR A LARGER EXPENDITURE FOR EACH PUPIL IN A SPECIAL CLASSIFICATION. THIS IS ACCOMPLISHED BY COUNTING EACH SPECIAL CLASSIFICATION PUPIL AS 1.5 OR MORE AS SPECIFIED ABOVE. THIS RESULTS IN AN OVER-STATEMENT OF THE ACTUAL PUPIL COUNT AND CONSEQUENTLY REDUCES THE AVERAGE PER PUPIL EXPENDITURE OTHERWISE CALCULATED.

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.
SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, PUBLIC SCHOOL FINANCE: PROFILES OF THE STATES, 1979 EDITION.

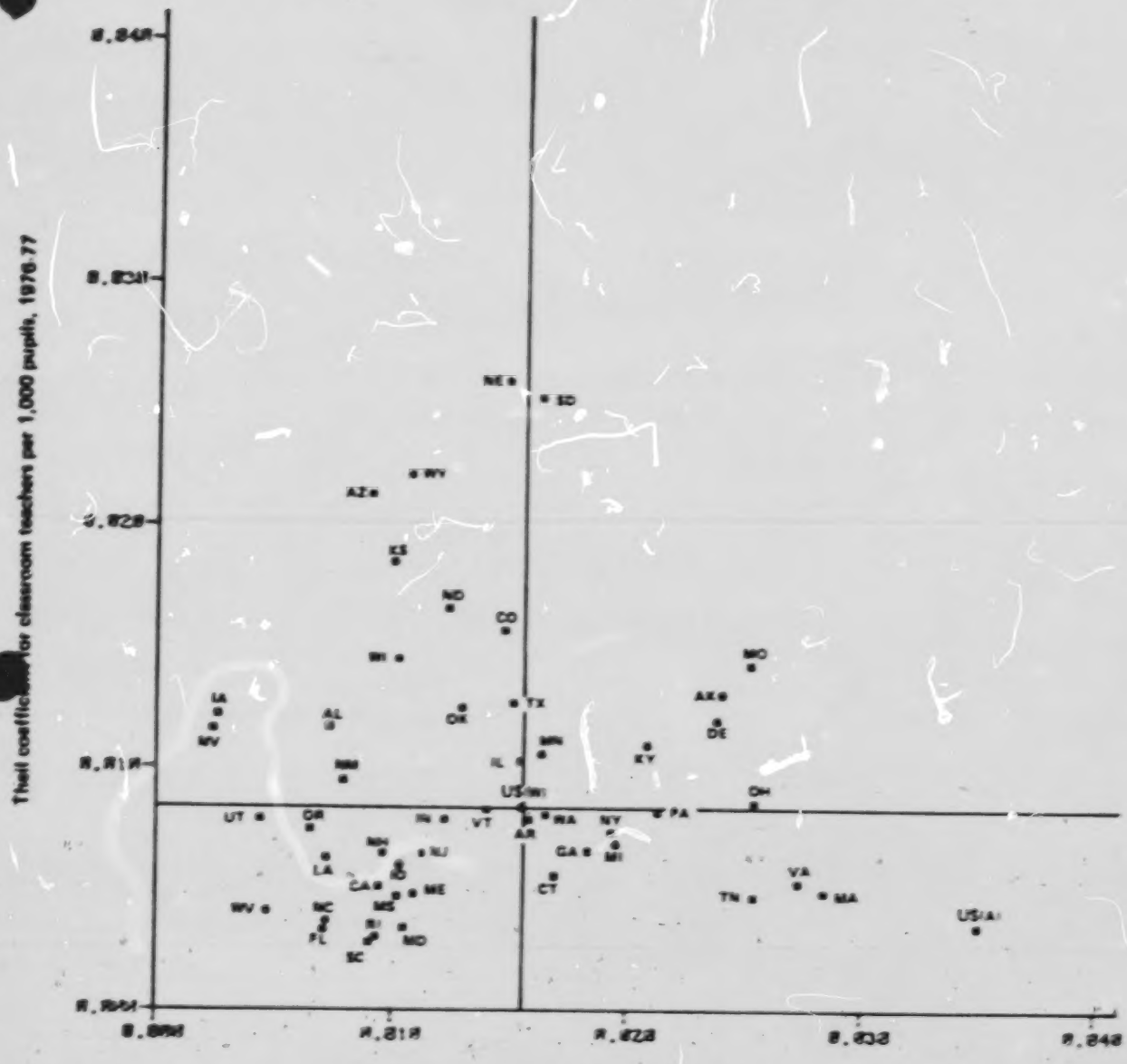
In contrast to these substantial reductions in measured disparity, school system size and metropolitan status do not explain within State differences in expenditures, when these characteristics are used to decompose disparity.

Classroom teacher disparities. In addition to the analysis of school system expenditures, the study examines the distribution of teacher staffing levels among school systems. National average within State disparity and State-to-State disparity for teachers per 1,000 pupils are similiar to those for expenditure per pupil after expenditure is adjusted for State-to-State cost of living differences. Within State disparities in expenditure and disparities in classroom teachers appear to reflect geographic and economic conditions in States; teacher disparities exceed expenditure disparities in States with low population density, while the reverse pattern is true for States having high population density areas (chart 3). As a result, the State ranking by within State disparity of core current expenditure per pupil differs from the State ranking on within State disparity of teachers per 1,000 pupils.

Changes in resource disparity. The report examines changes in the average level of school system disparities for the nation and also changes in level of disparities for each State. The national measurement of average expenditure disparity for school systems remained virtually unchanged during the period 1969-70 to 1976-77. There was virtually no change during this period in the national within State disparity measure of core current expenditure per pupil or of teachers per 1,000 pupils. Some States made appreciable shifts in their pattern of differences in per pupil expenditures and teachers per pupil during this period, but few reliable generalizations regarding those changes can be made (chart 4). The lack of any measurable change in National disparities and the lack of any appreciable pattern of changes in disparities for particular States are major findings of this report.

Chart 3

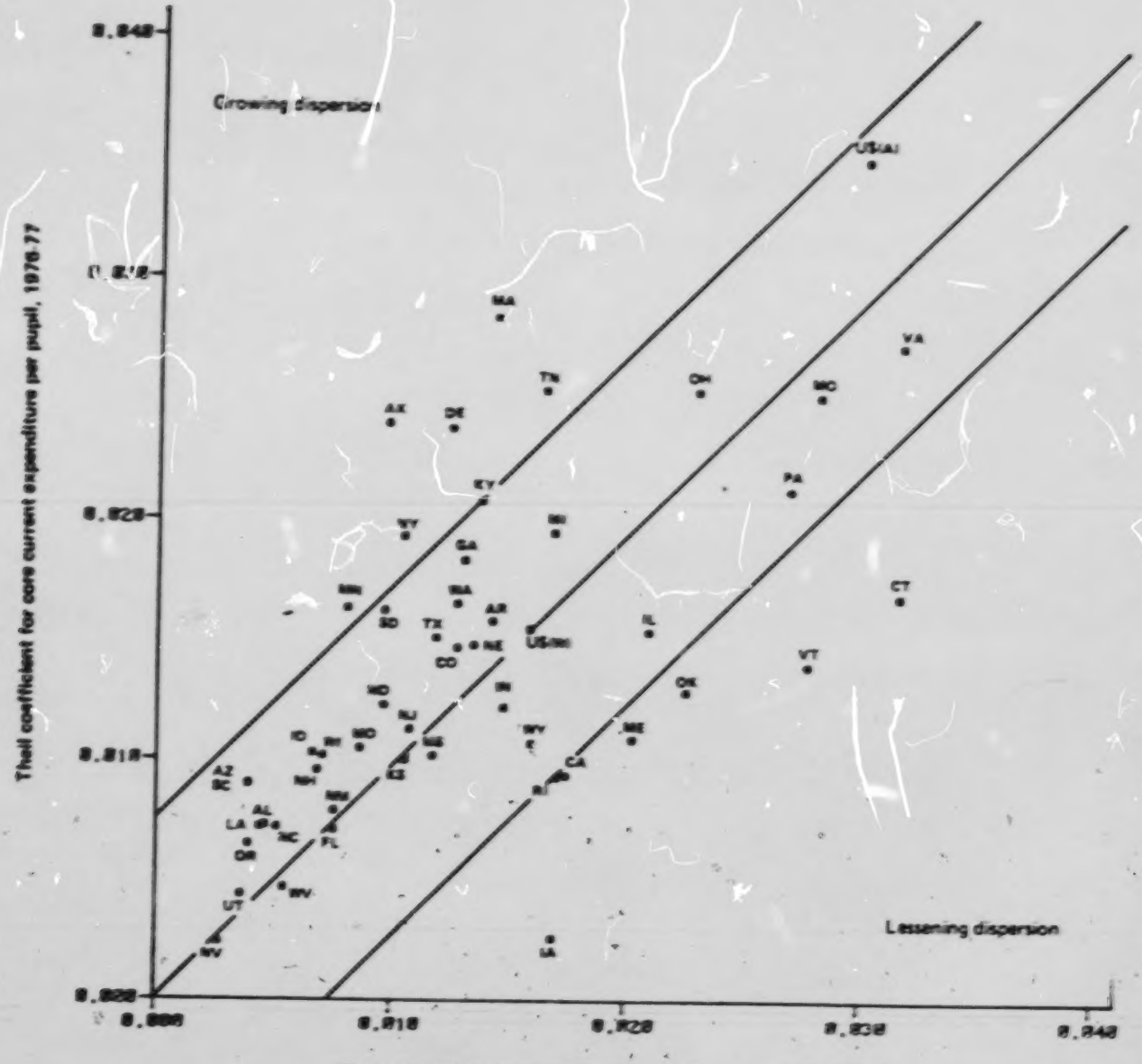
Theil Coefficients for Core Current Expenditure and Classroom Teachers, by State: 1976-77



Source: U.S. Department of Education, National Center for Education Statistics, *Public School Finance: Profiles of the States*, 1979 edition, tables 3.18 and 3.19.

Chart 4

Theil Coefficients for Core Current Expenditure, by State: 1969-70 and 1976-77



Source: U.S. Department of Education, National Center for Education Statistics, *Public School Finance: Profiles of the States*, 1979 edition, table 3.18.

Wealth Neutrality. The wealth neutrality analysis was hampered by lack of comparable data and consensus on definitions of wealth neutrality. Wealth neutrality is said to exist if educational resources available to students are independent of the wealth of the school system. This statement suggests that wealth neutrality can be measured. There are shortcomings to the use of any single statistical measure such as correlation, regression coefficient or elasticity.

Considerable effort was made to make the property valuation data comparable, and considerable strides were made toward comparable data on a school system level. Even so, the analysis is restricted by serious problems of comparability in property valuation data. Limitations preclude a national analysis of the State to State differences and the school system to school system differences within States analogous to that computed for core current expenditures per pupil.

For most States property values are equalized to a State standard. In such cases, the statistical properties of correlation coefficients and elasticities permit the calculation of comparable statistics. However, these two measures produce different rankings of States. Therefore, no conclusions about the wealth neutrality of States' school finance plans can be drawn from a single statistic. Despite the problems confronting the analysis, three primary conclusions about wealth neutrality are drawn in this report.

The compensating effects of State school finance plans on local tax receipts mitigate the dispersion of expenditures that would be expected if school systems relied solely on their ability to tax local property valuations. The measure of dispersion by State for "computational tax rate" is only half that for property valuations for the majority of the States.

Futhermore, the measure of dispersion by State for core current expenditure per pupil is only one-fifth that for "computational tax rate" (chart 5). No State has dispersion in expenditures among school systems as great as its dispersion for property valuations or computational tax rates. This evidence leads to the major conclusion that each State makes an effort to compensate for variations in local wealth.

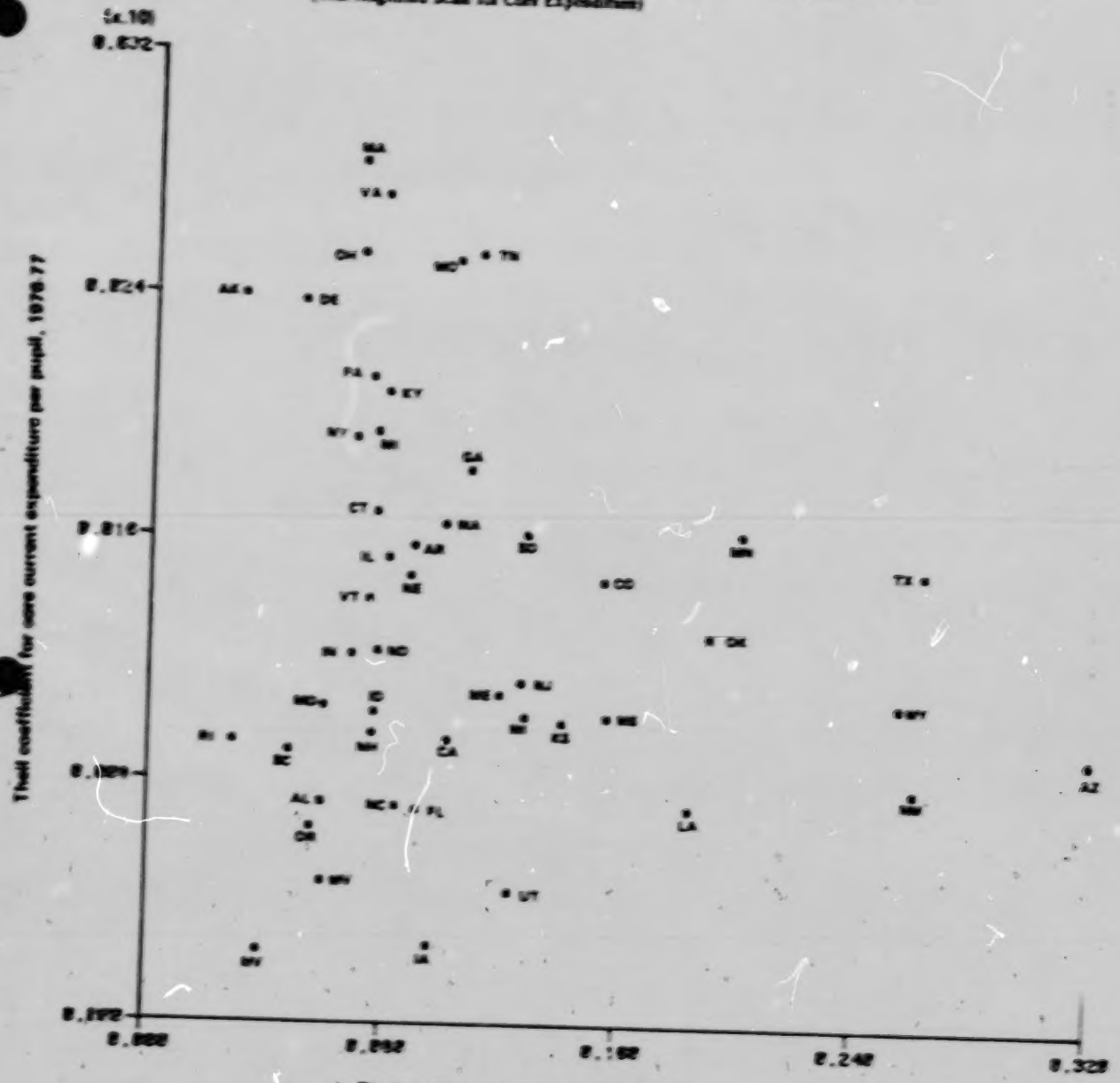
The operational definitions of wealth selected for use in analyses of wealth neutrality greatly influence the results. Using State aggregate data for the two measures commonly used, personal income and property valuations, yields conflicting conclusions regarding wealth neutrality across the Nation.

Adjustments for State-to-State cost of living differences increase the apparent wealth neutrality. This suggests that high correlations between expenditures and wealth may occur in part because both variables are influenced by similar cost of living differentials. Data on a school system basis could not be analyzed for such relationships in this analysis because cost of living or cost of education indexes are not now available at a school system level.

Summary

The study found both departures from wealth neutrality and disparities from equal spending per pupil in the funding of public elementary and secondary education. Their effects on disparities of actual educational service to pupils are less than the usually-measured expenditure disparities, mainly because of the presence of cost differentials among States and school systems, and to a lesser extent because of problems in data comparability across school systems and States. Real disparities exist and these disparities merit attention from those interested in equality of educational opportunity.

Chart 5
Theil Coefficients for Core Expenditure and Property Valuation, by State: 1976-77
(with Magnified Scale for Core Expenditure)



Source: U.S. Department of Education, National Center for Education Statistics, *Public School Finance Profiles of the States*, 1979 edition, tables 3.15 and 4.7.

Chapter 1

Introduction

Variations in the distribution of educational resources and expenditures on a State, school system, or pupil basis have long been of concern to educators, legislators, and the general public. The concern has been strengthened by numerous studies attempting to document the extent of these variations, in order to propose means of compensating for identified inequities. The concern about unequal educational opportunity implied by these differences has intensified in recent years. Many court challenges to State plans for funding education have been made. These court challenges in several States have been modeled on the Serrano vs Priest case in California which held that differences in expenditure per pupil should not be related to the wealth of the school system where the pupils reside.

This interest in school finance issues, intensified by court focus on the distribution of resources, contributed to the legislative requirement passed in 1978 directing the National Center for Education Statistics to prepare biennially composite statistical profiles of the distribution of resources for elementary and secondary education among the States and among school districts of each State. The language of the legislation indicates the Congressional motivation and intent:

> "(1) (1) In addition to its other responsibilities, the National Center for Education Statistics shall, in consultation with the Office of Education, collect uniform data from the States on financing of elementary and secondary education. Each State receiving funds under the Elementary and Secondary Act of 1965 shall cooperate with the National Center in this effort.

"(2) (A) The National Center shall, in consultation with the Office of Education, publish by no later than September 30, 1979, and by no later than September 30 of each second fiscal year thereafter, a composite profile of each State showing the degree to which each has achieved equalization of resources for elementary and secondary education among the school districts within the State. A summary of these profiles shall show this equalization among the States.

"(B) In compiling the profiles required by this paragraph, the National Center shall list the degree of equalization both within and among the States according to the following standards:

"(i) the disparity in expenditures among school districts;

"(ii) the disparity from wealth neutrality; and

"(iii) such other measures as the National Center considers appropriate, including a consideration of price differentials and pupil-teacher ratios."

— Section 1201, P.L. 95-561, amending Section 406(b) of the General Education Provisions Act, as amended (20 U.S.C. 1221e-1).

This report is the first response to the legislative directive. While it offers considerable discussion and extensive evidence related to distributional issues the report is only a first step towards meeting the full intent of the law. Many more issues have been raised than resolved; data analyses offer statistical evidence in support of known financing characteristics but also uncover unexplainable departures from expected patterns. The study of school finance issues should be regarded as an ongoing effort; this first biennial report documents progress thus far.

The responsibility assigned to the Center is of two distinct types: first, to select (or, if necessary, establish) statistical measures that portray inequalities in the distribution of resources and offer the means of showing progress toward some standard of equalization; second, to apply the selected measures to uniform data from all States. The result should be profiles showing State financing and resource distribution patterns in ways that permit examination of disparities both among and within States.

The legislation contributed to several aspects of the analysis plan. The directive to provide composite profiles was interpreted as requiring a multivariate approach to the study of the issues. Statistics used in earlier reports and other studies were not adequate for such a charge, which necessitated application of distributional measures capabable of comparing such diverse quantities as property values and classroom teachers, or expenditures and tax rates. Numerous measures were tested against data to ascertain their usefulness in studying the problem of resource distribution. In particular, the analysis applied one measure not heretofore employed in studying school finance problems.

The analysis also encompassed extensive data manipulation, conducted using data bases assembled from several sources. The findings are of course limited by the nature and scope of the data. The tasks of identifying necessary data elements and the measurement and institutional problems which impede efforts at standardization and uniformity have themselves contributed to plans for future data collection and analysis.

Issues Examined by the Study

The importance to educators, legislators and the general public of the financial issues examined here is evident. Education is a public good. Education provides opportunities for economic independence, intellectual

freedom, cultural and aesthetic appreciation, and the motivation to uphold the ideals of our democracy while enjoying personal freedoms. Thus an educated citizenry is essential if a democracy is to function effectively; hence the provision of education in an equitable manner to all public school children is a matter of general public concern.

While States have the constitutional responsibility for providing basic education they differ in the extent to which they retain those powers or delegate them to local education agencies. Local agencies may, in turn, assume this responsibility or contract with other governmental units to obtain educational services. This legal responsibility of the States for education as well as the more general democratic goal of providing equal educational opportunity has given impetus to education programs provided by federal and State governments. Yet persistent perceived and real differences in educational opportunity for the country's youth have contributed to a continuing interest in the means by which allocations of school resources are made.

The resources available for education are believed by many to affect the quality of education received by students. The exact nature of the relationship is uncertain despite many attempts to examine it; the relationship may indeed be highly variable. Certainly at some minimal level the availability of resources is a factor in determining the range of educational experiences. This study focuses on the provision and distribution of resources. It does not address the fundamental and important question of educational quality.

History of State Profiles

Variations in school expenditures are not new. Neither are studies which document and attempt to explain the differences. Disparities among States and school systems in their ability to finance schools were pointed out by U.S.

Commissioner of Education William T. Harris in 1905 1/. Harris measured State ability by the reported valuation of all real and personal property per capita and the daily earnings per inhabitant to reflect the differences in capacity to pay. A study for the National Education Association combined two major series in measuring the relative economic capacities of the States: the 1922 census data on State tangible wealth and the 1919-21 National Bureau of Economic Research estimates of State income 2/.

The National Survey of School Finance 3/, charged by the Congress to examine variables in the financing of education, undertook to measure not only the variation in ability but also the variations in effort and in school expenditures. This survey did much to develop the techniques used to evaluate school expenditures and the methods of presenting them. The Office of Education and the National Center for Education Statistics continued on a 10-year cycle since 1929-30 to provide similar data to interested citizens, school officials, school finance researchers, and governmental policy makers.

The National Survey of School Finance publication indicated that large variations in expenditures existed in 1929-30 and in 1931-32 for the 33 States included. In later studies, data for all States were included. The 1939-40 volume, which showed the situation before World War II, revealed that while there was decreased reliance on the property tax and a large shift to State support, substantial variations still existed 4/. The 1949-50 study 5/ charted the effect of the war years and the lessening of variations among States as income of the States became more equal and the lessening of variation within States as State support, expressed as a percentage of total funds, continued to increase. In these three publications, some changes in the number of pupils and classrooms were reported State by State but the national enrollment totals remained about the same.

The period from 1949-50 to 1959-60 showed a considerable increase in school-age population 6/. The percentage of funds from the State remained constant, and local school systems were under constant pressure to provide more classrooms in which to house these pupils. Within-State variation continued to decline as a percent of total expenditures, but the dollar difference between the high and low expenditure school systems increased.

The study for 1969-70 7/ documented changes over a period marked by a dramatic increase in funding by federal sources through The Elementary and Secondary Education Act of 1965. Other factors affecting school finance during the period included large increases in the amount and percent of funds from State sources for some States, court challenges to State distributions citing that equal provision of funds was not achieved, and special attention devoted to provision of education to minority and inner-city youths equal in quality to that provided in suburban schools.

In a further analysis of data for 1969-70 8/, data on elementary and secondary education were merged with data from an exploratory effort by the Center to relate decennial census data to a sample of school districts. This study examined the feasibility of detailed analyses by school district, incorporating such factors as ethnic composition, median income, and teacher salaries. Comprehensive analyses of the type modeled in this project will be possible using data from 1980, upon completion of the National Center for Education Statistics project to construct a geographic reference file that will provide census data by school district.

Scope of the Present Report

The present study comes at a time of renewed interest in the equitability of school financing. The legislation requiring the preparation of this report is concrete evidence of the high level of attention being directed to school finance issues. More than 25 States have made changes in school finance provisions in the past ten years. The changes have been motivated by realizations that both students and taxpayers may have been treated inequitably by funding plans that neither accommodated the needs of all students nor accounted for particular demographic or economic circumstances.

The orientation of this report is empirical, not philosophical. While a primary goal of the analyses of resource availability and distribution is to assess their equity, universally accepted definitions of equity do not exist. Considerable academic and political attention is being directed to the subject, and hopefully consensus will be reached at some time. This study is not contributing to that debate, although it is cognizant of the discussions. However, since equalization, cited in the legislation as an implicit criterion for equity, is a mathematical notion, it is possible to apply numerous statistical concepts and measures to an analysis of the degree of equalization of resources. The strengths and weaknesses of alternative techniques for describing distributions are examined.

This report thus attempts to make accessible to policy makers the best possible tools for examining characteristics revealed by the data. As future reports reveal more about measures and offer more detailed information derived from improved data, the academic discussions and the empirical reality may merge in the formulation of agreed-upon standards. Such agreement is unlikely in the near future, however, and meanwhile considerable progress is possible in establishing uniformity of data and describing phenomena. The series of

studies summarized by these reports has two objectives. First, it is attempting to develop meaningful indicators of disparity as measured by the dispersions of various distributions. Second, it is identifying significant characteristics of the distributions of numerous variables central to the analysis.

Thus, the present study contributes both new evidence and new methodology to the exploration of school finance issues. The report examines data on educational expenditures, revenues, and funding sources following a period of considerable change. More than 25 States have altered their systems of support for public education in the years since the last comprehensive report documenting expenditure variations. The study also initiates the application of statistical measures of inequality that shed new insights into patterns of disparities and the results of actions designed to reduce them. In particular, the use of the Theil Coefficient, borrowed from information theory, has proven to be of great explanatory value in the statistical analysis 9/. Because its use in this report represents its first major application to school finance data, the utility of the coefficient is probably not fully explored. Future reports should show an increased range and facility of statistical applications.

This report presents results of applications of a wide variety of statistical measures to numerous data bases to enable the reader to compare results reported here with those of other studies using the same statistics and to indicate the differences among the alternative measures applied to the same data base. In this regard, the statistics presented serve as a benchmark for the future while permitting comparison with prior work on varied bases. Future reports will concentrate most likely on the Theil coefficient on district data weighted by enrollment as the preferred statistic for disparity measures.

Chapter 1
Footnotes

1/ W.T. Harris. "The Political Economy of School Finances." Educational Review 29: 486-509, May 1905.

2/ John K. Norton. The Ability of the States to Support Education. Washington, D.C.: National Education Association, 1926. 88 pp.

3/ Paul R. Mort and Research Staff, National Survey of School Finance, American Council on Education. State Support for Public Education. New York: Bureau of Publications, Teachers College, Columbia University 1933. p. 44-89.

4/ John K. Norton and Eugene S. Lawler. An Inventory of Public School Expenditures in the United States. A Report of the Cooperative Study of Public School Expenditures. Vol I and Vol II. Washington: American Council on Education, 1944. 409 pp.

5/ Clayton D. Hutchins and Albert R. Munse. Expenditures for Education, at the Midcentury. U.S. Department of Health, Education, and Welfare, Office of Education, Misc. No. 18. Washington: U.S. Government Printing Office, 1953. 136 pp.

6/ Forrest W. Harrison and Eugene P. McLoone. Profiles in School Support, A Decennial Overview. U.S. Department of Health, Education, and Welfare, Office of Education, Misc. No. 47. Washington: U.S. Government Printing Office, 1965. 182 pp.

7/ Eugene P. McLoone. Profiles in School Support, 1969-70. U.S. Department of Health, Education, and Welfare, National Center for Education Statistics, 1974. 148 pp.

8/ William B. Dorfman, Project Director. Educational Opportunity: The Concept Its Measurement, and Application. U.S. Department of Health, Education, and Welfare, National Center for Education Statistics, Sponsored Report Series, 1975. 65 pp.

9/ The measures used in this report are described in Chapter 6.

Chapter 2

Limitations of the Study

It is important that users of this study understand its limitations and their effects on the range of the analyses and on the results. The major limitations are examined here. Later chapters on data and statistical methodology discuss the related technical issues in greater detail. Lack of data accounts for many of the limitations; the absence of workable definitions of essential concepts accounts for others; and organizational characteristics of school systems are responsible for still others. The net effect of the limitations identified here should be to caution the reader against attaching great significance to small observed differences either in data used in the analysis or in the derived measures characterizing the distributions. Major problems attributable to noncomparable data and accounting procedures have been removed, but some remain.

This study examines the financing of all public elementary and secondary education offered in the United States during the school year 1976-77 and, for purposes of comparison, 1973-74 and 1969-70. Thus revenue and expenditure patterns affecting approximately 90 percent of the nation's 50 million young people in grades K through 12 are within the scope of the analyses. Data at both the State and school system levels are utilized.

While NCES is working to establish uniform data standards and collections, time did not permit formulation of standards or new data collections prior to the preparation of this report. Hence the study was at the outset limited to analyses possible using available data sets which are less complete than is desirable. Adjustments made to correct for the more serious of these problems have had the effect of limiting the analysis.

Data on School Expenditure

For interstate comparisions of expenditures, all expenditures for public

elementary and secondary education within a State are included, whether these are, for example, categorical funds from federal programs, direct expenditures by State education agencies (SEAs), expenditures by intermediate education agencies (IEAs), or expenditures by local school districts or education agencies (LEAs). Funds directed to nonpublic schools were eliminated from the analyses whenever it was possible to do so.

Extensive and longstanding efforts to promote standardization of terms have yielded uniform, comparable national definitions of expenditure categories. However, considerable variation in State operating and/or accounting procedures renders reported figures noncomparable in many instances. For example, retirement expenditures will depend on the type of funding mechanism adopted by a State, the presence or absence of social security, and other factors. These characteristics affect the level of expenditures and the unit bearing the expense (State, local or other governmental) and hence are responsible for some of the expenditure variations. Similar problems arise because of differences in handling of such categories as textbook purchase, transportation, instructional TV and food expenditures. Within any given State, definitions or assignments of expenditures to particular categories are reasonably consistent. Thus, a statistic showing high disparities among the systems in State A may accurately portray differences within the State, as would a similar statistic for State B. However, the statistic for State A may not be comparable to that for State B. The problems of data analyses deriving from alternative practices are not readily amenable to correction. More uniform definitions or additional data collection will not lessen the problems. Additional analyses that would extend the range of possible conclusions are discussed in Chapter 8.

The data base used to examine resource variations within States differs in several respects from that employed in the State level analysis.1/ The data on local school system finances, collected under contract with the Bureau of the Census, Department of Commerce, may not include all education finances in the States because expenditures by the State education agency, intermediate education agencies, and other local agencies are sometimes excluded. For example, a number of cities provide "free" transportation for pupils through reduced fares on city mass transportation and these expenditures are not recorded in accounts of local school systems.

In order to compare data across school systems, one should be able to assume that systems are similar in organization and operating procedures. However, in many areas, school systems serve only elementary or only secondary pupils. Costs of providing secondary school services generally are higher than those for elementary schools, primarily because of differing pupil-teacher ratios.2/ Therefore, to examine costs for each district in a given State as if the district served a mix of pupils that was 2/3 elementary and 1/3 secondary automatically introduces distortions. The adjustment used here, which was to limit examinations of within-State disparities to data for unified systems, or systems serving pupils at all levels, had the effect of omitting many systems from the within-State analyses. The discussion of data bases identifies the States where the absence of unified systems limited the analysis, and documents the extent of those limitations. In the extreme case of Montana, no within-State analyses were made because there are no unified systems.

Possible biases due to differential elementary versus secondary costs may still affect the results. Such a bias will occur if some unified school

systems do not have the approximate 2/3 - 1/3 distribution of students by level. In cases where the unified system provides education for part of the K-12 grade span and separate elementary or secondary systems provide the remainder, elimination of the separate elementary and secondary schools does not remove the bias among unified school systems. Similarly, a preponderance of nonpublic schools serving pupils at either level may affect the relative distribution for some systems.

Data on Wealth and Taxation

Noncomparability was particularly serious among data reflecting property wealth. Property wealth is measured here in terms of either equalized or assessed property valuation. Data on equalized property valuation were used where it was available. However, even in States having equalized property valuation, property values may not be equalized to 100 percent of sales price or market value. Because values for certain school systems did not appear to be valid, the number of systems included in analyses involving property wealth data varies from other analyses. The effects of these problems on the various wealth neutrality analyses are treated more specifically in Chapter 4.

Units of Analysis and Data Adjustments

Differences in school system size also posed problems for the design of the analysis. The legislation directs the presentation of disparities among school systems. Almost 30 percent of the nation's pupils are enrolled in 2 percent of the unified school systems; and fewer than 3 percent of the pupils comprise the total enrollments of over 25 percent of the unified school systems. Table 2.1 shows these distributions, which are summarized in chart 2.1.

Therefore a presentation by system does not show fully the extent of differences in resources assigned to pupils because it gives disproportionately greater attention to pupils in smaller systems. Neither does it facilitate

TABLE 2.1

NUMBER AND PERCENT OF SCHOOL SYSTEMS AND PUPILS BY ENROLLMENT SIZE OF SCHOOL SYSTEM, UNITED STATES, 1976-77

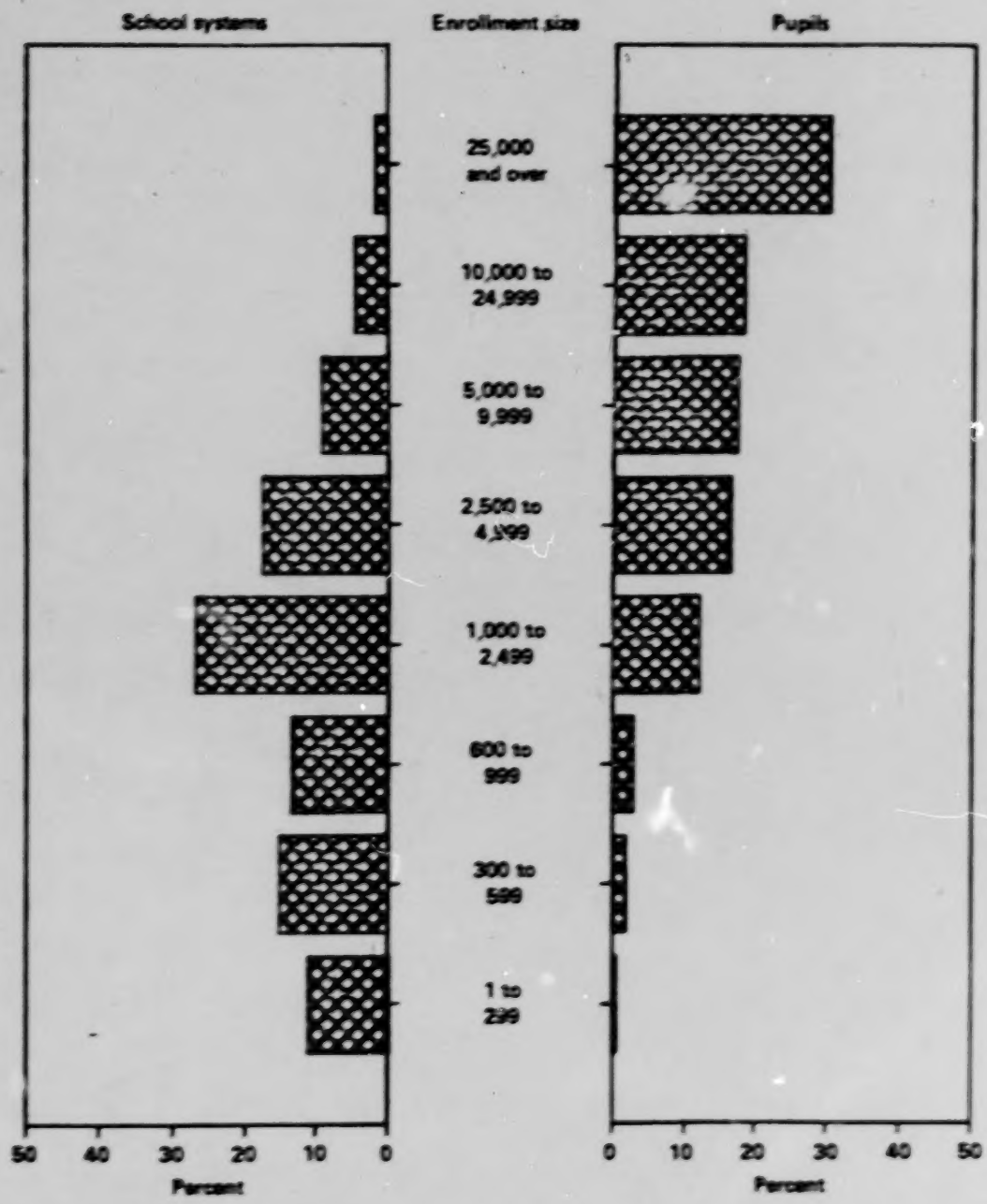
(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

ENROLLMENT SIZE	SCHOOL SYSTEMS		PUPILS	
	NUMBER	PERCENT	NUMBER	PERCENT
TOTAL	10900	100.00	40417743	100.00
25,000 & OVER	183	1.68	12256750	30.33
10,000-24,999	509	4.67	7384722	18.27
5,000- 9,999	1013	9.29	7041444	17.47
2,500- 4,999	1916	17.58	6716941	16.62
1,000- 2,499	2936	26.94	4871622	12.05
600- 999	1476	13.54	1159557	2.87
300- 599	1647	15.11	726339	1.80
1- 299	1220	11.19	240368	0.59

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

Chart 2.1
Percent of School Systems and Pupils, by Enrollment Size of School System, United States: 1976



Source: Table 2.1

the consideration of policy alternatives that would correct disparities, because the size of affected pupil populations is one of the factors determining the magnitude of the task. Both system and pupil population perspectives are useful. Hence results include tabulations treating each system within a State equally (unweighted) as well as treating systems adjusting for population size (system values weighted by enrollment).

The limitations imposed by data availability and comparability have been mentioned and are described in detail later. In addition, the absence of adequate measures or standards for analytically treating factors believed to influence cost differentials permitted only illustrative treatment of some important issues. Some States and systems acknowledge that certain population groups have special needs that entitle them to receive larger proportionate shares of available educational resources. The report presents available data on State populations of students having special need. The analysis shows illustrative corrections for special needs populations at the State level. It does not examine the impact of high costs that could be imposed at the local level due to the presence of large special needs populations.

Differences in costs of obtaining services probably account for some of the observed differences in spending within as well as among States. The cost of living varies by region and jurisdictional characteristics, affecting the costs of providing educational services. Reliable, generally accepted cost of education indexes are not yet available to remove these effects from the analysis, despite discussions of the need for such measures. Thus the more detailed analyses utilize data unadjusted for cost of education differences. One attempt was made to ascertain the possible effect of a cost adjustment on expenditures at the State level. However because the adjustment applied to the

data was not developed with particular attention to factors contributing to educational expenditures, it was not used throughout the analysis. There are other reasons why a State by State adjustment is inadequate, even assuming such an adjustment were available. Not even a preliminary correction for within-State difference (occasioned by such factors as urban-rural cost differentials) was possible.

As important as these corrections are for accurate analyses, it is unlikely that information to facilitate them will become available in the near future. The analysis therefore suffers from two types of possible errors of interpretation. Disparities are clearly overstated in many cases. At the same time, readers may be tempted to attribute even larger proportions of disparities to cost of living differences than are justified.

Time itself imposed many other limitations on the analysis. Even the choice of a particular year for the analysis had the effect of possibly biasing results for some States. For example, extensive changes in the organization of school systems for the State of Arizona during the period studied had considerable impact on the data available for that State. Hence the statistics for Arizona should not be considered as reliable as those for other States.

Many of the questions raised in the course of the study are worthy of much more extensive examination than they have been given here. Chapter 8 discusses some topics where further analysis is particularly needed; readers may well wish to add their own agendas to that list.

This report should be regarded as a first step, helpful in providing a context for examining school finance, illustrating the information available through a statistical analysis and, hopefully, suggesting possibilities. The analyses present a general picture of disparities; they do not present a

precise picture. Possibilities for refined interpretations must wait for more comparable data and, in some cases, improved measures.

Chapter 2

Footnotes

1/ Characteristics of the two data bases are described in Chapter 7.

2/ Special facilities needed to supply secondary education (laboratories, physical education areas, and so forth) affect capital costs of each level but do not result in significant differences in operating costs.

Chapter 3

The Distribution of Educational Resources

Almost all of the Nation's school systems in 1976-77 spent between $624 and $3,722 per pupil to provide instructional services. State average expenditure per pupil in 1976-77 ranged from $881 to $2,864, with the national per pupil average of spending by States being $1,380. Within-State differences in spending, while not so great as the more than three fold range in States' average spending, showed expenditures at the highest levels to be from 30 percent to 120 percent greater than expenditures at the lowest levels. For whatever reasons, the fact of considerable variation in per pupil educational expenditure across the country is undeniable.

An inspection of the distribution of one component of instruction, classroom teachers, reveals considerable range also. In 1976-77 the Nation's school systems hired between 25 and 98 teachers for each 1,000 pupils; State averages of classroom teachers per 1,000 pupils ranged from 41.2 to 60.5 with the national average being 49.3. Thus the lack of uniformity of the use and/or availability of resources also applies to the distribution of this more limited measure of educational resources.

To the extent that equal amounts of resources imply equal services, these figures on the ranges of available resources suggest that considerable disparity exists in educational opportunity. In truth, there are many reasons for resource variations. This chapter reviews the character of these resource distributions and examines possible explanatory factors.

A Context for Examining the Distribution of Resources

The distribution of educational resources must be examined in a manner that addresses the concerns over equalization of resources. The sequential presentation used here is intended to show, generally in order of importance, features

of the distributions consistent with this perspective. State averages are reviewed first, followed by school system averages.

The level of resources available to the units being examined (States or school systems) is of primary importance. If available resources could in all cases be considered generous, those differences that do exist would be less critical than if the presence of low levels of support suggested possible hardship. Consequently, ranges and concentration of distributions both identify extreme cases and suggest the extent of dispersion in the distributions considered. Distributional statistics both on State or school system averages unweighted and averages weighted by enrollments offer more detailed measures of the distributions from important alternative perspectives.

Many factors are known to contribute to differences in resources available for providing education. Cost of living differentials and special needs populations are two of the more frequently cited bases for justifiable differences. An analysis of the resource differences, while possibly suggesting reasons for them, must be followed by explicit attempts to identify the magnitude of these factors.

This analysis did examine contributing factors where data and available measures permitted. The lack of accepted cost of living adjustments for education has already been mentioned. Problems in determining equitable allocations for populations with special needs precluded definitive treatment of these issues, though many exploratory analyses were possible and are reported here. Notably, the formulation of unduplicated counts of special needs pupils permitted the hypothetical application of weighting factors to study the effect of using additional resources to provide equivalent services for these pupils.

While the examination of factors contributing to resource variations does explain or reduce the extent of observed differences, considerable dispersion in the distribution of resources remains. Because the study is motivated by concerns for equity among the recipients of education, it would be useful to establish standards for equalization, or in a less demanding context, categories of goodness or badness that could be applied to observations on the distributions. Yet several problems make it impossible to establish definitive standards. Alternative inequality measures do not always provide the same ranking of distributions. Furthermore, it is frequently argued that the choice of a standard must depend upon the particular aspect of inequality with which one is concerned. In fact, some of the standards which are discussed widely are inconsistent. Thus, just as the analysis provided a number of alternative ways of looking at the distributions, it discusses where appropriate the application of several standards.

The limitations of the data bases cited earlier also influenced the analysis and the structure of this report, encouraging the variety of presentations of results so as to compensate for presentations that could unfairly characterize some States. The use of the two data bases described earlier is a case in point. While the system level data base is used for the more detailed analyses, a State level data base from additional sources rather than a State data base composed by aggregating the system data was used for State level comparisons. While the use of two data bases admits the possibility of confusion in the review of tables, the availability of the more complete and more comparable State level data base was believed to offer advantages which outweighed the problems it might pose.

Per pupil resource variations are not new. Chapter 1 enumerated some of the earlier studies documenting and measuring resources available for education. The level of available resources offers the most general information

for importance in examining resource differences. The changes in resource levels also provide an important perspective. In addition to the detailed analyses of data for 1976-77 performed for this study, differences in resources levels for 1969-70 and 1973-74 were examined. The analyses thus encompass a period of active discussion and, in the case of many States, school finance reform. The ensuring presentation of resource differences provides a context for the statisics describing their distribution.

Two measures of educational expenditures are included in the analysis to reflect different views of expenditures. An attempt was made to establish a category of those expenditures that directly contribute to educational activities provided to students. The resulting concept, core current education expenditure, includes expenditures to provide public elementary and secondary education administration, instruction, attendance and health services, operation and maintenance of plant (including equipment replaced during the fiscal year), and fixed charges. 1/

An alternative expenditure measure includes the full costs of providing education incurred by the unit being studied. This measure, total education expenditure, includes all core current education expenditures plus pupil transportation services, interest, payments to State and local school housing authorities, expenditures for construction of school buildings and acquisition of new equipment, purchase of land and existing structures, and miscellaneous other current expenditures. This measure gives a more precise indication of the magnitude of the costs which need to be financed though it does so at a considerable loss of comparability and uniformity of included items across States and school systems within States.

Core current education expenditure (hereafter referred to as core expenditure) remains the preferred measure. Not only is core expenditure more comparable across States, but also the items included are less affected by

purely geographic considerations (as are expenditures for transportation) and by large but infrequent expenditures (for example, capital expenditures for new buildings).

The Distribution of Resources Among States

A greater than three-fold range in average State core expenditure per pupil for 1976-77 characterizes the extremes in State resources for education, suggesting considerable dispersion from the United States average per pupil spending by States of $1,380. State per pupil averages for core expenditure for the years 1969-70, 1973-74, and 1976-77, with ranks identified for each year, are shown in table 3.1. Between 1969-70 and 1976-77 national average core expenditure increased by $679 per pupil from a base of $701, an increase of about 97 percent. The United States average for core expenditure per pupil for an intermediate year, 1973-74, was about $1,018.

The increase in national average core expenditure from 1969-70 to 1976-77 was studied to identify contributing factors. The analysis identified several components. The $679 increase represents a $278 increase per pupil in teacher salary expenditure per pupil plus a $401 increase in other than teachers' salary expenditures. About $209 of the teacher salary expenditure per pupil increase of $278 may be attributed to the 54.7 percent increase in the average salary of teachers from $8,635 in 1969-70 to $13,357 in 1976-77, and $69 of the $278 represents the change in the teachers per 1,000 pupils from 44.1 in 1969-70 to 49.3 in 1976-77. Coincidentally, the increase in the average salary of teachers is equal to the change in the Consumer Price Index of 54.7 percent from 113.14 in 1969-70 to 175.80 in 1976-77 (adjusted to the school year calender). Three-fourths of the $278 per pupil salary increase, therefore, represents a price increase and one-fourth of the $278 per pupil salary increase represents an increase in real resources by increasing the teacher-pupil ratio.

TABLE 3.1

STATE AVERAGE CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, BY STATE: 1969-70, 1973-74, AND 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

STATE OR OTHER AREA	1976-77		1973-74		1969-70	
	AMOUNT	RANK	AMOUNT	RANK	AMOUNT	RANK
UNITED STATES	$1388		$1019		$791	
ALABAMA	961	48	797	47	654	48
ALASKA	3964	1	1747	1	995	3
ARIZONA	1342	24	959	34	669	29
ARKANSAS	899	50	669	48	634	50
CALIFORNIA	1614	6	1198	10	794	7
COLORADO	1415	21	987	24	646	29
CONNECTICUT	1691	14	1186	7	864	5
DELAWARE	1586	8	1162	9	775	12
DIST OF COLUMBIA	1913	3	1341	3	889	1
FLORIDA	1206	32	881	29	634	35
GEORGIA	1049*	42	737	46	609	46
HAWAII	1537	13	1179	8	784	10
IDAHO	981	46	736	43	529	43
ILLINOIS	1459	23	1086	15	786	11
INDIANA	1171	35	844	31	613	31
IOWA	1427	20	1004	21	739	19
KANSAS	1386	26	959	25	669	26
KENTUCKY	998	44	734	50	654	48
LOUISIANA	1315	45	755	41	611	44
MAINE	1369	41	894	35	590	34
MARYLAND	1545	11	1082	16	780	16
MASSACHUSETTS	1717	9	1193	6	762	18
MICHIGAN	1548	10	1199	5	797	6
MINNESOTA	1529	14	1115	13	788	9
MISSISSIPPI	891	51	616	51	481	51
MISSOURI	1116	37	821	33	552	38
MONTANA	1479	17	984	27	664	23
NEBRASKA	1411	22	979	28	683	24
NEVADA	1235	27	926	36	671	22
NEW HAMPSHIRE	1161	32	847*	38	605	32
NEW JERSEY	1789	4	1332	4	977	4
NEW MEXICO	1159	33	780	38	554	37
NEW YORK	1937	2	1437	2	1083	1
NORTH CAROLINA	1024	44	784	37	527	43
NORTH DAKOTA	1331	28	934	32	573	39
OHIO	1327	29	956	27	649	27
OKLAHOMA	1113	38	754	39	630	40
OREGON	1593	7	1130	12	789	8
PENNSYLVANIA	1556	9	1134	11	769	13
RHODE ISLAND	1492	15	1090	14	796	14
SOUTH CAROLINA	971	47	734	45	589	45
SOUTH DAKOTA	1116	36	804	36	594	33
TENNESSEE	1037	43	681	48	681	47
TEXAS	1144	34	769	42	523	42
UTAH	1077	40	759	40	550	39
VERMONT	1283	25	1017	20	728	21
VIRGINIA	1213	30	893	34	614	30
WASHINGTON	1461	19	1079	18	759	17
WEST VIRGINIA	1382	39	737	44	557	36
WISCONSIN	1483	18	1025	19	732	20
WYOMING	1942	13	1477	17	761	15
PUERTO RICO	531	N.A.	447	N.A.	387	N.A.

N.A.= NOT APPLICABLE

*NATIONAL CENTER FOR EDUCATION STATISTICS ESTIMATE.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

It was not as easy to separate price increases from real increases in the remaining $401 of the increase in core expenditure. The level of some required expenditure components increased dramatically. For example, based on the average salary of teachers for the United States, average teacher-pupil ratio and social insurance contribution rate, social insurance payments per pupil increased from $16.52 per pupil in 1969-70 to $38.54 in 1976-77, an increase of $22.02 or 133 percent. While social insurance payments represent a small portion of expenditure per pupil, these and rising prices for goods such as fuel and paper explain the increasing share of core expenditure which is not teacher salaries, 52.2 percent in 1967-77, up from 45.7 percent in 1969-70.

The distributions of State average expenditure are examined in a variety of ways, for the purposes of establishing the context for considering disparities and providing a general picture of the distributions before applying statistical measures of dispersion. Thus averages and ranges are identified first, followed by inspection of the concentration of values around the mean. The statistics showing standard deviations and coefficients variation are then introduced.

Inspection of State averages shows that in 1976-77, 23 States had average expenditures above the national average core expenditure per pupil. The 10 States with the highest averages were predominately populous, urbanized States such as California, Massachusetts, Michigan, New Jersey, New York and Pennsylvania. The lowest-spending States in core expenditure were mostly in the South.

While average per pupil expenditure has been increasing, the high and low State values and their ratios indicate that expenditure differences among State have been growing. In 1969-70 the difference of core expenditure per pupil between the highest-spending and lowest-spending States was $682 per pupil; by 1973-74, it was $1,161; and in 1976-77 it was $1,983. The ratio of high to low increased from about 2.7 in 1969-70 to about 3.2 in 1976-77 (table 3.2).

TABLE 3.7

SELECTED MEASURES OF DISPERSION OF CORF CURRENT EDUCATION EXPENDITURE PER PUPIL, BY STATE: UNITED STATES, 1969-70, 1973-74, AND 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

MEASURE	1976-77	1973-74	1969-70
HIGH STATE VALUE	$2864	$1777	$1083
LOW STATE VALUE	$881	$616	$401
RATIO OF HIGH TO LOW STATE VALUE	3.2	2.9	2.7
OUTSIDE 15% ABOVE OR BELOW UNITED STATES AVERAGE			
NUMBER OF STATES	27	30	24
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	57.1	53.8	42.2
UNWEIGHTED			
MEAN (AVERAGE OF STATE AVERAGES)	1336	961	664
STANDARD DEVIATION	340	239	144
COEFFICIENT OF VARIATION(X100)	25.5	24.9	21.8
WEIGHTED BY PUPILS			
MEAN (UNITED STATES AVERAGE)	1380	1018	701
STANDARD DEVIATION	295	259	166
COEFFICIENT OF VARIATION(X100)	21.4	25.4	23.6
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	24.7	23.5	20.6

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.
SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

However, this increase in the range of values is attributable to the fact that during this period, Alaska became the highest-spending State, replacing New York. If expenditures for 1976-77 and 1969-70 are compared for the same two States, Mississippi and New York, the ratio actually declined slightly, from 2.7 to 2.1. This latter comparison might be the more appropriate, since average expenditures for Alaska reflect a considerable difference in cost of living between that State and the contiguous 48 States. Alaska has a cost of living averaging at least 25 percent greater than that of the other States.

An indication of the concentration of States around the mean values is provided by counting those States with averages falling within 15 percent of the United States average. In 1976-77, more than half the States, 27, had State averages outside of the arbitrary bounds defined by values either above or below 15 percent of the United States average. These States enrolled 57.1 percent of the nation's pupils. While the remaining States probably enrolled some pupils who did receive close to the national average, this review underscores the wide dispersion in the distribution of educational resources across the country.

The United States per pupil average of $1,380 for 1976-77 (a statistic calculated by weighting State averages by numbers of pupil per State) differs from the average of State averages, which was $1,336. The higher United States per pupil average reflects the generally higher expenditure levels in the more populous States (for example, New York, California, Pennsylvania, Michigan, Illinois).

The coefficient of variation provides a measure of dispersion, showing the standard deviation divided by the arithmetic mean. In addition to showing the coefficient of variation for the distributions of State average values unweighted and weighted by numbers of pupils, a coefficient of variation has been calculated for the unweighted standard deviation using the United States average. The coefficient for the unweighted distribution, expressed as a

percent, steadily increased between 1969-70 and 1976-77, from 21.8 percent, to 24.9, then to 25.5. However, when computed with State averages weighted by enrollment, the coefficient increased from 23.6 to 25.4 percent between 1969-70 and 1973-74 then dropped to 21.4 percent in 1976-77.

In 1976-77, total education expenditure (hereafter called total expenditure) per pupil for the 50 States and the District of Columbia was about $1,769 per pupil (table 3.3). This is $389 per pupil, or 29 percent, more than the United States average for core current expenditure per pupil. State averages ranged from a high of $3,554 per pupil in Alaska to a low of $1,141 in Mississippi. The close relationship between core current expenditure and total expenditure is shown in Chart 3.1 which shows State averages on the two measures ranked by core expenditure.

The changes in dispersions of total expenditure per pupil are similar to those for core expenditure. The expenditure difference between the highest and lowest States grew substantially: from $826 in 1969-70 to $2,413 in 1976-77. Accordingly, the ratio of the high to low values increased from 2.6 to 3.1 (see table 3.4). Exactly one half the States, enrolling somewhat less than half the students (48.5 percent) were in States with averages outside of 15 percent of the United States average. Yet all the coefficients of variation show that the increasing variation between 1969-70 and 1973-74 was reversed by 1976-77.

At the national level, then, inspection of measures of expenditure indicates that while the absolute difference in extreme values (and thus the ratio of high to low values) increased between 1969-70 and 1976-77, and dispersion is still considerable, dispersion did decrease.

One measure of educational resources which is free of some of the possible biases or definitional problems of the cost measures is the teacher-pupil ratio. Hence in addition to the two measures of cost, this analysis examined distributions of classroom teachers per 1,000 pupils. The measure was defined

TABLE 3.3

AVERAGE TOTAL EDUCATION EXPENDITURE PER PUPIL, BY STATE: 1969-70, 1973-74 AND 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

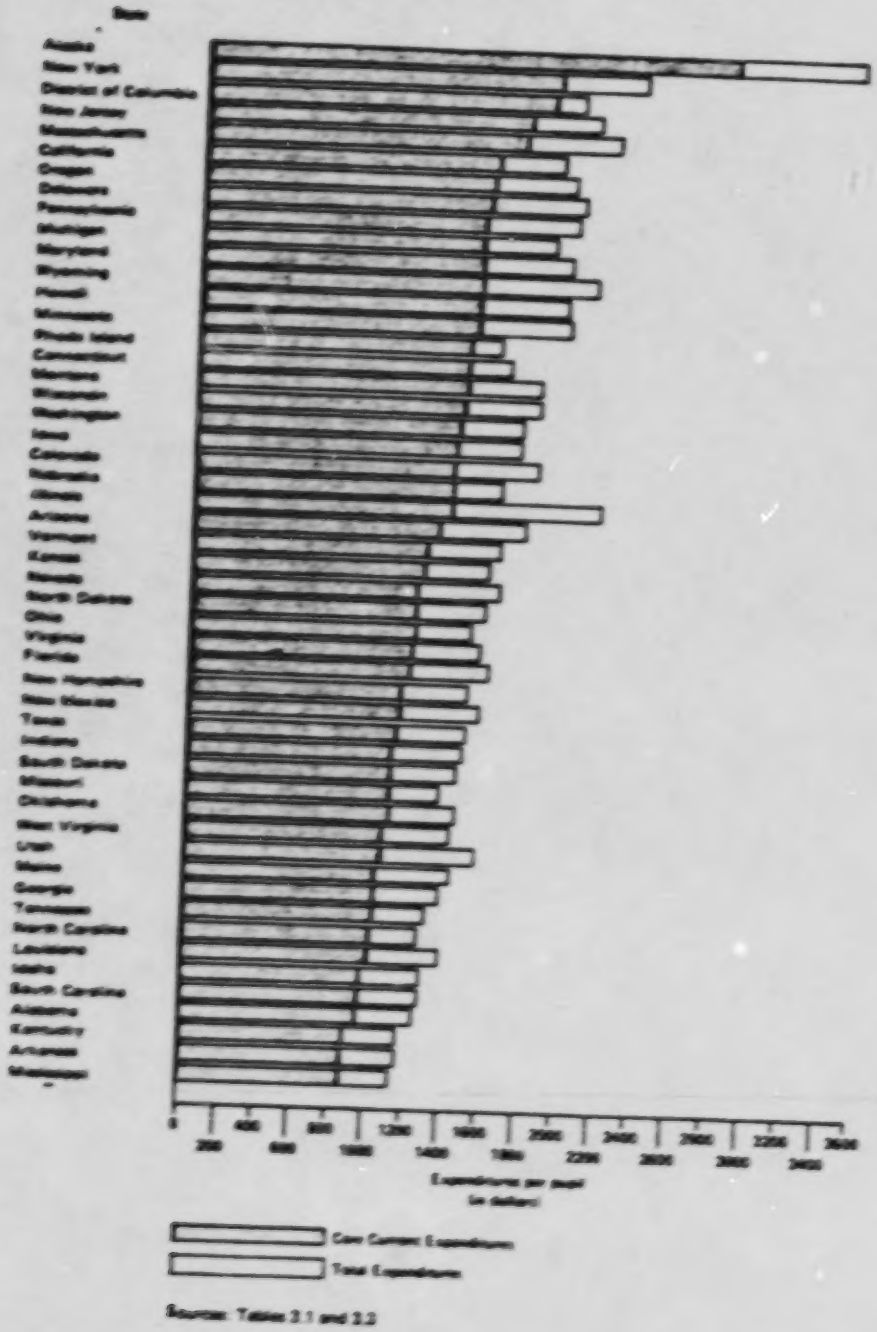
STATE OR OTHER AREA	1976-77		1973-74		1969-70	
	AMOUNT	RANK	AMOUNT	RANK	AMOUNT	RANK
UNITED STATES	1766		1597		983	
ALABAMA	1262	49	966	49	554	49
ALASKA	3954	1	2790	1	1346	1
ARIZONA	1639	18	1484	18	954	30
ARKANSAS	1171	49	973	47	576	48
CALIFORNIA	1961	14	1787	14	919	34
COLORADO	1845	19	1757	21	956	29
CONNECTICUT	1784	22	1760	13	1018	11
DELAWARE	2177	7	1959	9	1233	3
DIST OF COLUMBIA	2368	2	1834	3	1108	4
FLORIDA	1617	27	1476	27	839	35
GEORGIA	1378	42	937	43	671	42
HAWAII	2089	13	1691	7	1034	9
IDAHO	1393	45	920	45	674	41
ILLINOIS	2107	6	1939	17	966	26
INDIANA	1686	36	1616	27	891	31
IOWA	1783	21	1598	23	916	32
KANSAS	1680	29	1557	29	776	33
KENTUCKY	1186	50	987	50	854	50
LOUISIANA	1387	41	1056	39	683	43
MAINE	1630	29	1535	27	789	33
MARYLAND	2018	12	1783	12	1023	10
MASSACHUSETTS	2299	3	1631	9	827	37
MICHIGAN	1938	15	1639	9	1006	19
MINNESOTA	2016	11	1616	10	1074	8
MISSISSIPPI	1101	51	788	51	531	51
MISSOURI	1771	43	1539	38	894	39
MONTANA	1883	17	1589	25	921	36
NEBRASKA	1664	34	1387	33	830	34
NEVADA	1661	35	1599	24	867	23
NEW HAMPSHIRE	1819	25	1483	31	819	37
NEW JERSEY	2169	4	1844	4	1093	5
NEW MEXICO	1875	20	1531	96	782	37
NEW YORK	2193	2	1998	2	1317	2
NORTH CAROLINA	1276	47	965	41	644	46
NORTH DAKOTA	1589	29	1471	33	729	34
OHIO	1834	23	1693	29	906	29
OKLAHOMA	1658	37	963	42	652	45
OREGON	2026	15	1727	16	969	26
PENNSYLVANIA	2130	9	1819	11	1072	7
RHODE ISLAND	1898	26	1767	19	929	28
SOUTH CAROLINA	1293	46	936	44	660	44
SOUTH DAKOTA	1653	38	1538	35	765	34
TENNESSEE	1316	44	960	40	673	42
TEXAS	1914	24	999	48	662	41
UTAH	1566	32	1561	34	884	39
VERMONT	1871	23	1778	10	1050	6
VIRGINIA	1571	31	1144	26	785	31
WASHINGTON	1760	28	1565	15	995	13
WEST VIRGINIA	1677	40	912	46	734	36
WISCONSIN	1817	28	1767	21	889	15
WYOMING	2195	1	1986	5	964	21
PUERTO RICO	604	N.A.	443	N.A.	297	N.A.

N.A.= NOT APPLICABLE

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS. SPECIAL TABULATIONS FROM MERGED STATE-DATA FILE.

Chart 3.1
Total and Core Current Education Expenditures Per Pupil, by State.
United States: 1976-77



Source: Tables 3.1 and 3.2

TABLE 3.4

SELECTED MEASURES OF DISPERSION OF TOTAL EDUCATION EXPENDITURE PER PUPIL, BY STATE: UNITED STATES, 1969-70, 1973-74, AND 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

MEASURE	1976-77	1973-74	1969-70
HIGH STATE VALUE	$3554	$2298	$1346
LOW STATE VALUE	$1141	$788	$520
RATIO OF HIGH TO LOW STATE VALUE	3.1	2.9	2.6
OUTSIDE OF 15% ABOVE OR BELOW UNITED STATES AVERAGE			
NUMBER OF STATES	25	25	30
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	48.5	41.0	52.1
UNWEIGHTED			
MEAN (AVERAGE OF STATE AVERAGES)	1711	1208	851
STANDARD DEVIATION	404	296	193
COEFFICIENT OF VARIATION(X100)	23.6	24.5	22.7
WEIGHTED BY PUPILS			
MEAN (UNITED STATES AVERAGE)	1769	1257	883
STANDARD DEVIATION	354	299	198
COEFFICIENT OF VARIATION(X100)	20.0	23.8	22.5
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	22.9	23.5	21.8

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

as all full-time elementary and secondary teachers, excluding part-time teachers, principals or aides, divided by fall enrollment and multiplied by 1,000. The average numbers of classroom teachers per 1,000 pupils by State for the school years 1969-70, 1973-74 and 1976-77 are listed in table 3.5, together with ranks for each of those years. The values for 1976-77 are shown by rank in Chart 3.2. In 1976-77, the national average teacher-pupil ratio was 49.3 classroom teachers per 1,000 pupils. States ranged from a high of 60.5 classroom teachers per 1,000 pupils in Vermont to a low of 41.2 per 1,000 in Utah. A majority of States in 1976-77 had teacher-pupil ratios between 48.1 and 55.9.

Between 1969-70 and 1976-77 the national average teacher-pupil ratio increased from 44.1 to 49.3 or about 11.8 percent. Every State increased its teacher-pupil ratio — with the exception of the District of Columbia — and the increases ranged from 0.2 percent in Michigan to 24.0 percent in Tennessee.

The rank order correlation between teacher-pupil ratios in 1969-70 and 1976-77 was 0.78. This indicates that the relative position of the States remained fairly stable. Some States did show substantial movement. By increasing its teacher-pupil ratio from 48.2 in 1969-70 to 57.2 in 1976-77, for example, Connecticut moved from 13th to 4th place. On the other hand, by only increasing its teacher-pupil ratio from 43.1 to 43.2, Michigan fell from 32nd place to 47th place during that same period.

Summary measures of dispersions of the classroom teachers per 1,000 pupils ratio among the States for 1976-77, 1973-74, and 1969-70 are shown in table 3.6. The ratio of high to low State values in 1976-77 for classroom teachers per 1,000 pupils was 1.5. This compares to the ratios of 3.2 for core expenditure per pupil for that year, and 3.1 for total expenditure per pupil. Another measure of dispersion also indicates that there is less variation in the teacher-pupil ratio among the States than there is in expenditures. The

TABLE 3.5

NUMBER OF CLASSROOM TEACHERS PER 1,000 PUPILS BY STATE: 1969-70, 1973-74, AND 1976-77

(INCLUDES TEACHERS FOR ALL PUBLIC SCHOOL PUPILS)

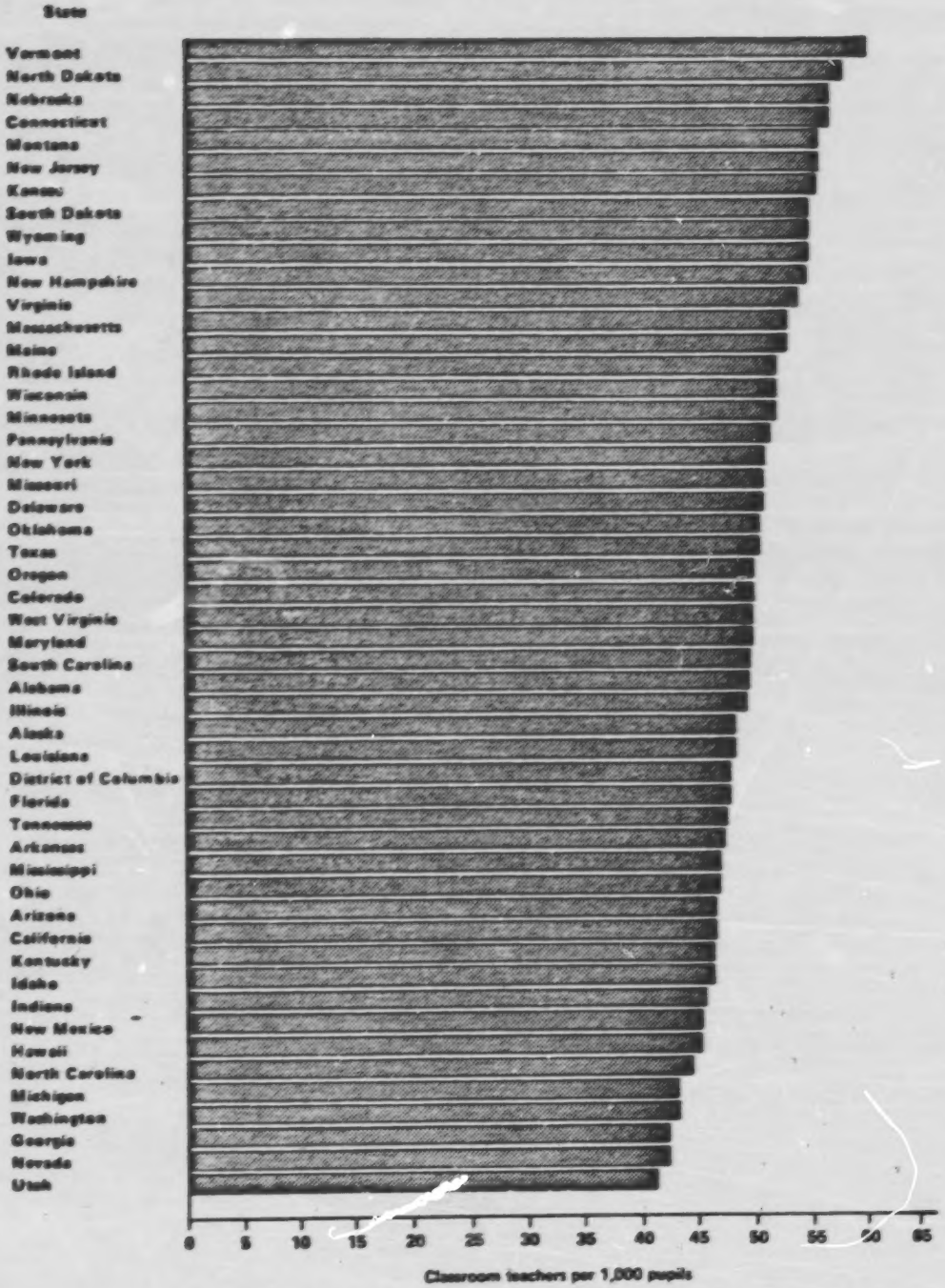
STATE OR OTHER AREA	1976-77		1973-74		1969-70	
	AMOUNT	RANK	AMOUNT	RANK	AMOUNT	RANK
UNITED STATES	49.32		46.96		44.13	
ALABAMA	49.51	29	44.42	35	41.47	43
ALASKA	49.07	31	49.04	17	45.74	22
ARIZONA	46.70	39	40.96	50	42.73	33
ARKANSAS	47.38	36	44.55	34	42.62	34
CALIFORNIA	46.57	40	44.96	33	41.41	44
COLORADO	49.92	25	46.85	28	43.45	31
CONNECTICUT	57.16	4	52.09	9	48.20	13
DELAWARE	50.99	21	47.24	24	43.91	28
DISTRICT OF COLUMBIA	48.13	33	48.37	19	49.67	8
FLORIDA	47.81	34	43.91	40	43.47	30
GEORGIA	42.42	49	41.79	46	38.62	49
HAWAII	45.24	45	44.13	39	42.45	37
IDAHO	46.38	42	43.69	42	44.29	26
ILLINOIS	49.37	30	47.76	20	45.88	21
INDIANA	45.64	43	43.11	43	41.20	45
IOWA	55.89	10	51.82	10	50.08	7
KANSAS	55.93	7	55.39	3	49.37	10
KENTUCKY	46.54	41	44.26	36	41.67	41
LOUISIANA	48.16	32	49.73	15	42.24	38
MAINE	53.17	14	47.31	23	50.36	6
MARYLAND	49.82	27	46.97	25	45.61	23
MASSACHUSETTS	53.71	13	54.97	4	47.51	15
MICHIGAN	43.23	47	43.85	44	43.13	32
MINNESOTA	52.20	17	48.45	18	45.92	20
MISSISSIPPI	47.29	37	43.16	31	39.34	48
MISSOURI	51.11	20	45.77	30	44.26	27
MONTANA	56.17	5	51.30	12	48.36	12
NEBRASKA	57.21	3	53.49	7	51.39	5
NEVADA	42.28	50	42.14	49	40.17	47
NEW HAMPSHIRE	54.84	11	50.59	14	46.10	19
NEW JERSEY	56.07	6	53.43	8	47.21	16
NEW MEXICO	45.26	44	44.15	38	42.60	35
NEW YORK	51.55	19	53.74	6	48.93	11
NORTH CAROLINA	44.41	46	43.70	41	43.49	29
NORTH DAKOTA	58.49	2	54.73	5	51.86	3
OHIO	46.94	38	44.20	37	41.63	42
OKLAHOMA	50.87	22	45.95	29	46.36	18
OREGON	50.44	24	46.69	27	49.45	9
PENNSYLVANIA	52.16	18	47.61	22	44.81	24
RHODE ISLAND	53.15	15	51.06	13	46.90	17
SOUTH CAROLINA	49.81	28	43.80	45	42.16	39
SOUTH DAKOTA	55.13	8	51.59	11	53.40	1
TENNESSEE	47.67	35	41.15	48	38.42	50
TEXAS	50.45	23	46.91	26	41.85	40
UTAH	41.19	51	40.45	51	37.53	51
VERMONT	60.50	1	58.94	1	52.22	2
VIRGINIA	54.09	12	47.69	21	44.46	25
WASHINGTON	43.15	48	41.47	47	40.46	46
WEST VIRGINIA	49.84	26	45.15	32	42.45	36
WISCONSIN	52.22	16	49.87	16	47.95	14
WYOMING	55.10	9	56.95	2	51.49	4
PUERTO RICO	35.95	N/A	35.70	N/A	31.97	N/A

N/A = NOT APPLICABLE

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

Chart 3.2
Average Number of Classroom Teachers Per 1,000 Pupils, by State: 1976-77



Source: Table 3.5

TABLE 3.6

SELECTED MEASURES OF DISPERSION OF THE NUMBER OF CLASSROOM TEACHERS PER 1,000 PUPILS,BY STATE: UNITED STATES, 1969-70, 1973-74, AND 1976-77
(INCLUDES ALL PUBLIC SCHOOL PUPILS AND TEACHERS)

MEASURE	1976-77	1973-74	1969-70
HIGH STATE VALUE	60.5	58.9	53.4
LOW STATE VALUE	41.2	40.4	37.5
RATIO OF HIGH TO LOW STATE VALUE	1.5	1.5	1.4
OUTSIDE OF 15% ABOVE OR BELOW UNITED STATES AVERAGE			
NUMBER OF STATES	5	5	5
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	3.4	4.4	1.8
UNWEIGHTED			
MEAN (AVERAGE OF STATE AVERAGES)	50.2	47.4	45.0
STANDARD DEVIATION	4.5	4.5	3.9
COEFFICIENT OF VARIATION(X100)	9.0	9.5	8.7
WEIGHTED BY PUPILS			
MEAN (UNITED STATES AVERAGE)	49.3	46.7	44.1
STANDARD DEVIATION	3.8	3.9	3.2
COEFFICIENT OF VARIATION(X100)	7.6	8.4	7.3
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	9.2	9.6	8.9

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS
SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

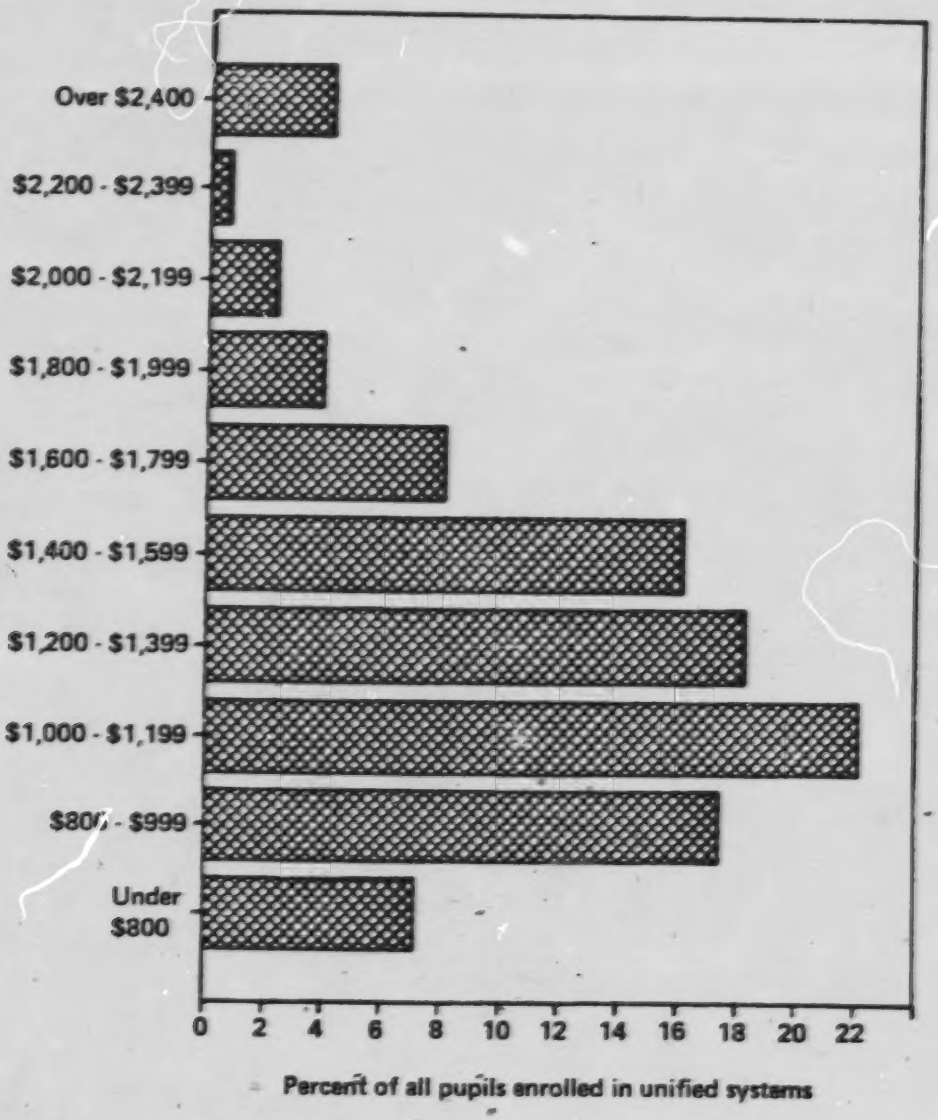
coefficient of variation (weighted by pupils) in 1976-77 was 7.6 percent for the teacher-pupil ratio, while it has been calculated as 21.4 percent for core expenditure, and 20.0 percent for total expenditure. This smaller amount of dispersion in the teachers per 1,000 pupils ratios is not surprising, for several reasons. First, the ratio is only one of several components making up core expenditure and thus would be explaining only a portion of the dispersion in core expenditure. More importantly, however, the ratio examines a measure free of the effects of price variations across States, which, it will be noted later, probably increase measured dispersion.

The Distribution of Resources Within States

The State averages examined earlier offer a generalized statement of resource variations, derived from a data base consistent across States. Within States, resource differences across school systems are also common, with the exceptions of Hawaii and the District of Columbia, which are single system jurisdictions. The distribution of educational resources provided to pupils within each State is studied utilizing the school system level data base introduced in Chapter 2. The percentages of the students in each expenditure category of the unified school systems that comprise this data base (systems that serve students in grades one through twelve) are shown in Chart 3.3 (data in table 3.7). For purposes of this display, each pupil in a given school system is presumed to receive the average amount of resources expended per pupil for that system. The table also presents cumulative percentages of pupils and school systems accompanying each expenditure category, permitting comparisons of differences in the two distributions.

To incorporate into the analysis the impact of varying school system size on the distribution of resources to students, system averages were weighted by the numbers of pupils in each system. The system averages that occur at the 95th and 5th percentiles of this weighted distribution are shown as proxy

Chart 3.3
Percent of Pupils, by Core Current Expenditure Per Pupil for Unified School Systems, United States: 1976-77



Source: Table 3.7

TABLE 3.7

NUMBER AND PERCENT OF PUPILS AND SCHOOL SYSTEMS BY LEVEL OF DISTRICT CORE CURRENT EXPENDITURE PER PUPIL: UNITED STATES, 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

LEVEL OF CORE CURRENT EXPENDITURE PER PUPIL	ENROLLMENT			SCHOOL SYSTEMS		
	NUMBER	PERCENT	CUMULATIVE PERCENT	NUMBER	PERCENT	CUMULATIVE PERCENT
TOTAL	44417741	100.00	100.00	10950	100.00	100.00
500- 549	9956	0.02	0.02	4	0.04	0.04
550- 599	66769	0.15	0.16	21	0.19	0.23
600- 649	194489	0.48	0.62	85	0.78	1.01
650- 699	607626	1.50	2.12	185	1.70	2.71
700- 749	896667	2.22	4.34	288	2.64	5.35
750- 799	1106441	2.76	7.08	377	3.46	8.81
800- 849	1303006	3.22	10.30	477	4.38	13.18
850- 899	1738350	4.30	14.60	544	4.99	18.17
900- 949	1817297	4.50	19.10	592	5.43	23.61
950- 999	2185090	5.41	24.50	670	6.15	29.75
1000-1049	2378471	5.88	30.39	666	6.11	35.86
1050-1099	1976637	4.89	35.28	615	5.65	41.51
1100-1149	2285966	5.66	40.93	643	5.90	47.41
1150-1199	2272860	5.62	46.56	614	5.63	53.05
1200-1249	1895197	4.69	51.25	585	5.37	58.41
1250-1299	1860668	4.60	55.85	529	4.85	63.27
1300-1349	1861804	4.61	60.46	544	4.99	68.26
1350-1399	1751524	4.33	64.79	500	4.59	72.84
1400-1449	1706694	4.42	69.21	381	3.50	76.34
1450-1499	1554698	3.85	73.06	386	3.54	79.89
1500-1549	1442767	3.57	76.63	305	2.80	82.68
1550-1599	1735888	4.29	80.92	267	2.40	85.08
1600-1649	1376015	3.40	84.33	260	2.39	87.39
1650-1699	741305	1.83	86.16	200	1.83	89.12
1700-1749	623635	1.54	87.70	191	1.66	90.78
1750-1799	492018	1.22	88.92	139	1.28	92.04
1800-1849	785811	1.94	90.87	119	1.09	93.13
1850-1899	249719	0.62	91.48	82	0.75	93.88
1900-1949	354178	0.88	92.36	78	0.72	94.61
1950-1999	169859	0.42	92.78	65	0.60	95.21
2000-2049	219082	0.54	93.32	45	0.41	95.62
2050-2099	349598	0.86	94.19	62	0.57	96.19
2100-2149	182165	0.45	94.64	41	0.38	96.57
2150-2199	176298	0.44	95.07	36	0.33	96.92
2200-2249	63688	0.16	95.23	31	0.28	97.20
2250-2299	96452	0.24	95.47	32	0.29	97.50
2300-2349	59110	0.15	95.62	24	0.22	97.72
2350-2399	64191	0.16	95.77	22	0.20	97.92
2400-2449	35793	0.09	95.86	20	0.18	98.10
2450-2499	1148421	2.86	98.70	22	0.20	98.30
2500-2549	33140	0.08	98.78	12	0.11	98.41
2550-2599	66105	0.16	98.95	18	0.17	98.58
2600-2649	45283	0.11	99.06	14	0.13	98.71
2650-2699	31376	0.08	99.14	14	0.13	98.83
2700-2749	87516	0.22	99.35	10	0.09	98.93
2750-2799	23593	0.06	99.41	10	0.09	99.02
2800-2849	75942	0.07	99.48	9	0.08	99.10
2850-2899	16255	0.04	99.52	7	0.06	99.17
2900-2949	44981	0.11	99.63	15	0.14	99.30
2950-2999	14450	0.04	99.66	5	0.05	99.35
3000-3049	15385	0.04	99.70	10	0.09	99.44
3050 & OVER	120374	0.30	100.00	61	0.56	100.00

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED DISTRICT DATA FILE.

measures of the ranges of resources provided to students. The 5 percentiles at the top and bottom of the distribution are ignored on the assumption that peculiar, extreme circumstances are likely to exist in those instances. The ranges of core expenditure per pupil for school systems with grades 1-12 for 1976-77 and 1969-70 are shown by State in table 3.8. The ranges for 1976-77 are shown graphically in Chart 3.4. The differences between high (95th percentile) and low (5th percentile) spending systems were over $1,000 per pupil in four States, less than $300 in three States. Other States exhibited high-low differences at intermediate values.

An inspection of the ranges of values of core expenditure for 1969-70 and 1976-77 reveals that the differences between 95th and 5th percentiles within States, as well as among States, have been increasing over time. As was noted earlier, proportional increases in expenditures, such as those due to inflation, would yield growing absolute differences.

A view of the concentration of system amounts within each State is provided by noting the percentages of school systems and of pupils whose system averages are outside of 85 and 115 percent of the State's per pupil weighted system average. These boundaries have been arbitrarily selected; other alternatives could also have been applied for this informal inspection. Table 3.9 lists the percentages for 1976-77. Three States — Alaska, Illinois, and Tennessee — have a larger percentage of their pupils outside these limits than the 63.0 percent of pupils for the Nation. Three States — New York, Ohio, and Tennessee— have a larger percentage of their school systems outside these limits than the 62.0 percent of school systems for the nation which are outside of these bounds.

To provide a context for the more detailed statistical measures applied to the school system level data base, summary statistics on core expenditure were compiled from this data base to parallel the presentation in table 3.2. Two

TABLE 1.8

[illegible]

(FOR SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	REFLECTING PROPORTION OF PUPILS PER SCHOOL DISTRICT CURRENTLY AND PUPIL AND TAX DIFFERENCE BETWEEN TOP 5TH AND BOTTOM 95TH PERCENTILES							
	1976-77				1969-70			
	AVERAGE (MEAN)	5TH PERCENTILE	95TH PERCENTILE	DIFFERENCE RATIO 95TH 5TH	AVERAGE (MEAN)	5TH PERCENTILE	95TH PERCENTILE	DIFFERENCE RATIO 95TH 5TH
ALABAMA	757	8637	3960	9111	8374	1324	8410	8119
ALASKA	2486	2100	3727	1910	959	431	1107	302
ARIZONA	1214	895	1411	424	711	467	774	121
ARKANSAS	812	620	1126	522	659	514	569	731
CALIFORNIA	1582	1249	1934	977	716	487	901	950
COLORADO	1459	1149	1948	737	567	444	764	769
CONNECTICUT	1444	1048	1844	987	783	482	1151	611
DELAWARE	1361	1019	2980	1459	491	567	467	980
DIST OF COLUMBIA	1914	1914	1914	1	889	889	889	1
FLORIDA	1256	1096	1958	662	467	587	791	766
GEORGIA	952	720	1186	916	684	488	677	787
HAWAII	1559	1089	1958	1	736	736	736	1
IDAHO	942	765	1144	381	514	488	914	759
ILLINOIS	1364	986	1414	919	783	667	941	818
INDIANA	1049	780	1381	923	630	469	786	914
IOWA	1377	1279	1417	332	733	467	1119	939
KANSAS	1229	971	1488	520	693	469	819	780
KENTUCKY	849	692	1189	584	514	405	667	767
LOUISIANA	946	784	1110	466	551	414	577	1411
MAINE	1056	813	1459	973	490	423	674	791
MARYLAND	1500	1220	2001	791	791	410	974	966
MASSACHUSETTS	2656	1214	2712	1502	765	487	1240	854
MICHIGAN	1552	982	1778	779	876	413	1487	876
MINNESOTA	1363	1075	1937	845	760	421	922	1011
MISSISSIPPI	811	483	1109	644	411	317	531	1011
MISSOURI	1108	795	1464	969	575	418	758	551
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1356	1076	1786	729	583	469	786	789
NEVADA	1218	1199	1371	178	960	639	956	1149
NEW HAMPSHIRE	1049	842	1139	681	580	490	713	2371
NEW JERSEY	1609	1245	2112	85	775	594	1015	971
NEW MEXICO	1186	1019	1912	893	594	468	674	1011
NEW YORK	2210	1569	2974	1311	1083	877	1384	4140
NORTH CAROLINA	1003	890	1287	397	519	429	912	1971
NORTH DAKOTA	1287	975	1967	992	594	467	969	2271
OHIO	1199	845	1639	795	539	469	893	999
OKLAHOMA	936	748	1190	423	670	377	971	1741
OREGON	1555	1240	1758	498	777	464	998	2401
PENNSYLVANIA	1376	1020	1810	780	497	460	969	1911
RHODE ISLAND	1444	1118	1708	587	781	487	1160	1881
SOUTH CAROLINA	845	663	1092	429	496	485	559	153
SOUTH DAKOTA	1058	689	1742	448	574	491	682	2111
TENNESSEE	881	681	1191	510	447	337	590	2301
TEXAS	1046	901	1329	428	506	387	644	2611
UTAH	1952	949	1716	789	569	468	646	1501
VERMONT	1316	934	1650	716	798	426	1022	1961
VIRGINIA	1122	964	1938	987	561	414	713	2971
WASHINGTON	1363	1176	1780	764	761	499	967	1781
WEST VIRGINIA	1034	819	1171	251	568	475	634	1461
WISCONSIN	1449	1194	1903	937	781	444	927	2611
WYOMING	1426	1282	1911	478	787	411	989	1781
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	

N.A. = NOT APPLICABLE/NOT AVAILABLE

1/ 1969-70 PUPILS ARE AVERAGE DAILY MEMBERSHIP (ADM) EXCEPT AS NOTED BELOW. 1969-70 DATA ARE UNIVERSE ESTIMATES FROM STATE RANDOM SAMPLES STRATIFIED BY ENROLLMENT SIZE ADJUSTED AND REWEIGHTED FOR SCHOOL SYSTEMS WITH GRADES 1-12. ESTIMATES ARE SUBJECT TO SAMPLING ERROR.

2/ 1969-70 PUPILS ARE 1969 FALL ENROLLMENT.

3/ 1969-70 PUPILS ARE ADM FOR FIRST SEVEN MONTHS OF 1969-70 SCHOOL YEAR.

4/ 1969-70 PUPILS ARE AVERAGE DAILY ATTENDANCE (ADA) DIVIDED BY 94 PERCENT TO APPROXIMATE ADM.

NOTES: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED SCHOOL DISTRICT FILE.

Chart 3.4
School System Core Current Education Expenditure Per Pupil, by State: 1976-77

(in School Systems with Grades 1-12)

Source: Table 3.8

TABLE 1.9

PERCENT OF PUPILS AND SCHOOL SYSTEMS WITHIN 15.0 PERCENT ABOVE OR BELOW THE STATE AVERAGE PER PUPIL AMOUNT FOR CURRENT EDUCATION EXPENDITURE, BY STATES: 1976-77

(EXCLUDES SMALL SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	PERCENT WITHIN 15.0 PERCENT ABOVE OR BELOW STATE AVERAGE CURRENT EXPENDITURE PER PUPIL	
	PERCENT OF PUPILS	PERCENT OF SCHOOL SYSTEMS
ALABAMA	72.67	75.95
ALASKA	83.36	98.62
ARIZONA	73.83	86.62
ARKANSAS	98.97	62.81
CALIFORNIA	87.34	93.33
COLORADO	96.22	91.41
CONNECTICUT	98.93	68.37
DELAWARE	68.98	68.65
DIST OF COLUMBIA	0.00	0.00
FLORIDA	95.87	98.98
GEORGIA	64.46	92.72
HAWAII	0.00	0.00
IDAHO	93.58	61.95
ILLINOIS	66.78	53.74
INDIANA	95.48	96.09
IOWA	3.38	19.69
KANSAS	91.55	68.72
KENTUCKY	69.66	91.92
LOUISIANA	78.66	72.73
MAINE	98.16	95.27
MARYLAND	96.87	97.98
MASSACHUSETTS	68.62	61.85
MICHIGAN	61.36	58.79
MINNESOTA	95.34	79.36
MISSISSIPPI	96.66	92.93
MISSOURI	66.73	68.12
MONTANA	0.0.	0.0.
NEBRASKA	94.57	58.34
NEVADA	6.67	91.29
NEW HAMPSHIRE	96.96	92.84
NEW JERSEY	98.68	91.53
NEW MEXICO	0.73	68.98
NEW YORK	98.87	78.61
NORTH CAROLINA	95.43	97.24
NORTH DAKOTA	95.48	98.69
OHIO	97.35	63.86
OKLAHOMA	96.62	93.74
OREGON	93.91	79.87
PENNSYLVANIA	91.86	92.38
RHODE ISLAND	62.13	91.43
SOUTH CAROLINA	73.35	95.69
SOUTH DAKOTA	96.35	95.16
TENNESSEE	72.75	73.21
TEXAS	93.73	91.39
UTAH	93.36	88.89
VERMONT	91.79	98.86
VIRGINIA	96.77	93.93
WASHINGTON	64.35	69.80
WEST VIRGINIA	5.89	98.91
WISCONSIN	91.09	91.75
WYOMING	93.74	98.53
PUERTO RICO	N/A	N/A

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM AGENCY SCHOOL DISTRICT DATA FILE.

versions of these summary statistics were prepared. Table 3.10 displays the summary statistics of system core expenditures using school systems as the unit of observation. When State averages are calculated using system averages as observations, both high and low State averages of school system averages are more extreme then were the values obtained from the State level data base. A greater spread may be observed in the system averages as well, with 62.0 percent of the systems having per pupil average core expenditure outside of 15 percent above or below the United States average. These systems enrolled 63.0 percent of the pupils in unified systems.

The second set of summary statistics was prepared from the school system level data base using system data weighted by enrollments to provide State averages. Table 3.11 provides these measures. It may be seen that when State averages are produced by this procedure, extreme values again exceed those in the State level data base, though the figures are close to those obtained using the unweighted school system data base. Calculations show 63.4 percent of the unified school systems, enrolling 63.5 percent of pupils in these systems, are outside of 15 percent above or below the United States weighted average for this group.

The school system data base also provided information on dispersions in total expenditure and in teachers per 1,000 pupils. Differences in extreme values for total expenditure were even more notable than those for core expenditure. The finding is not surprising given the inclusion of a variety of special expenditures in the total category. As table 3.12 shows, in 1976-77, the difference between high and low spending systems (at the 95th and 5th percentiles) was over $1,000 for 15 States; differences were less than $500 for 6 of the States with more than one system. The percentages of school systems outside of 85 and 115 percent of the State's average and the percentages of the State's enrollment in those systems are shown in table 3.13.

TABLE 3.10

SELECTED MEASURES OF DISPERSION OF DISTRICT CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, BY STATE: UNITED STATES, 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

MEASURE	VALUE
HIGH STATE AVERAGE OF DISTRICT AVERAGES	$3230
LOW STATE AVERAGE OF DISTRICT AVERAGES	743
RATIO OF HIGH TO LOW STATE AVERAGE	4.3
OUTSIDE OF 15% ABOVE OR BELOW UNITED STATES AVERAGE OF STATE AVERAGES OF DISTRICT AVERAGES	
NUMBER OF STATES	20
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	53.5
NUMBER OF SCHOOL SYSTEMS	6454
PERCENT OF SCHOOL SYSTEMS IN NATION	62.0
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE SCHOOL SYSTEMS	63.0
UNWEIGHTED	
MEAN (AVERAGE OF STATE AVERAGES OF DISTRICT AVERAGES)	1277
STANDARD DEVIATION	401
COEFFICIENT OF VARIATION(X100)	31.3
WEIGHTED BY PUPILS	
MEAN (UNITED STATES AVERAGE OF STATE AVERAGES OF DISTRICT AVERAGES)	1263
STANDARD DEVIATION	335
COEFFICIENT OF VARIATION(X100)	26.5
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	31.7

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

TABLE 3.11

SELECTED MEASURES OF DISPERSION OF DISTRICT CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, WEIGHTED BY PUPILS, BY STATE: UNITED STATES 1976-77

(INCLUDES ONLY PUPILS IN SCHOOL SYSTEMS WITH GRADES 1-12)

MEASURE	VALUE
HIGH STATE AVERAGE OF DISTRICT AVERAGES WEIGHTED BY PUPILS	$2496
LOW ATE AVERAGE OF DISTRICT AVERAGES WEIGHTED BY PUPILS	$757
RATIO OF HIGH TO LOW STATE AVERAGE	3.3
OUTSIDE OF 15% ABOVE OR BELOW UNITED STATES AVERAGE	
NUMBER OF STATES	28
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	58.6
NUMBER OF SCHOOL SYSTEMS	6892
PERCENT OF SCHOOL SYSTEMS IN THE NATION	63.4
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE SCHOOL SYSTEMS	63.5
UNWEIGHTED	
MEAN(AVERAGE OF STATE AVERAGES)	1259
STANDARD DEVIATION	324
COEFFICIENT OF VARIATION (X100)	25.7
WEIGHTED BY PUPILS	
MEAN (UNITED STATES AVERAGE)	1311
STANDARD DEVIATION	303
COEFFICIENT OF VARIATION (X100)	23.5
COEFFICIENT OF VARIATION (X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	25.2

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

TABLE 3.12

TOTAL EDUCATION EXPENDITURES PER PUPIL, BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	MEAN	MEDIAN, 5TH PERCENTILE, 95TH PERCENTILE LEVELS, AND THE DIFFERENCE BETWEEN THE 5TH AND THE 95TH PERCENTILE		
		5TH PER-CENTILE	95TH PER-CENTILE	DIFFER-ENCE: 95TH -5TH
ALABAMA.....	934	8794	81145	$351
ALASKA.....	3196	7449	6419	1970
ARIZONA.....	1619	1313	2214	901
ARKANSAS.....	1022	782	1359	577
CALIFORNIA.....	1802	1433	2432	999
COLORADO.....	1807	1346	2481	1397
CONNECTICUT	1685	1315	2475	1260
DELAWARE.....	1399	1252	2264	1013
DIST OF COLUMBIA	2211	2211	2211	*
FLORIDA.....	1359	1314	1810	494
GEORGIA.....	1193	983	1451	468
HAWAII.....	1917	1917	1917	0
IDAHO.....	1173	958	1441	482
ILLINOIS.....	1469	1144	2010	866
INDIANA.....	1351	1037	1734	698
IOWA.....	1614	1412	1960	548
KANSAS.....	1544	1223	2028	805
KENTUCKY.....	1143	875	1490	615
LOUISIANA.....	1239	1008	1617	609
MAINE.....	1323	1023	2941	1918
MARYLAND.....	1915	1413	2364	733
MASSACHUSETTS...	1969	1428	3539	2112
MICHIGAN.....	1625	1307	2151	844
MINNESOTA.....	1732	1379	2472	1093
MISSISSIPPI.....	1038	837	1330	493
MISSOURI.....	1294	947	1478	461
MONTANA.....	N.A.	N.A.	N.A.	N.A.
NEBRASKA.....	1647	1276	2294	1020
NEVADA.....	1535	1392	1582	200
NEW HAMPSHIRE...	1333	1035	1817	782
NEW JERSEY.....	1846	1473	2370	897
NEW MEXICO.....	1509	1249	2368	921
NEW YORK.....	2233	1776	3186	1410
NORTH CAROLINA..	1242	1029	1497	468
NORTH DAKOTA....	1445	1147	2310	863
OHIO.....	1482	984	2927	1943
OKLAHOMA.....	1182	948	1996	484
OREGON.....	1903	1484	2597	1113
PENNSYLVANIA....	1746	1326	2362	1036
RHODE ISLAND....	1587	1255	1845	590
SOUTH CAROLINA..	1072	948	1598	652
SOUTH DAKOTA....	1317	798	1974	1178
TENNESSEE.....	1150	837	1568	731
TEXAS.....	1307	966	1891	1027
UTAH.....	1470	1241	1984	743
VERMONT.....	1448	1115	1923	708
VIRGINIA.....	1342	1090	1930	839
WASHINGTON.....	1587	1170	2141	971
WEST VIRGINIA...	1356	1111	1768	656
WISCONSIN.....	1688	1377	2051	674
WYOMING.....	1933	1427	3198	1771

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

TABLE 3.13

PERCENT OF PUPILS AND SCHOOL SYSTEMS OUTSIDE 15.0 PERCENT ABOVE OR BELOW THE STATE AVERAGE PER PUPIL AMOUNT FOR TOTAL EDUCATION EXPENDITURE, BY STATES: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	PERCENT OUTSIDE 15.0 PERCENT ABOVE OR BELOW STATE AVERAGE TOTAL EDUCATION EXPENDITURE PER PUPIL	
	PERCENT OF PUPILS	PERCENT OF SCHOOL SYSTEMS
ALABAMA	29.11	30.00
ALASKA	86.63	72.41
ARIZONA	34.32	92.11
ARKANSAS	61.99	45.00
CALIFORNIA	37.02	41.57
COLORADO	94.85	63.04
CONNECTICUT	41.99	43.12
DELAWARE	37.55	45.45
DIST OF COLUMBIA	0.00	0.00
FLORIDA	26.00	26.87
GEORGIA	41.74	52.72
HAWAII	0.00	0.00
IDAHO	15.29	25.24
ILLINOIS	72.78	65.31
INDIANA	27.00	38.31
IOWA	0.85	17.92
KANSAS	27.58	47.56
KENTUCKY	70.27	57.95
LOUISIANA	23.61	33.33
MAINE	37.91	36.52
MARYLAND	21.97	33.33
MASSACHUSETTS	47.15	47.83
MICHIGAN	41.63	56.00
MINNESOTA	35.83	30.05
MISSISSIPPI	30.00	25.33
MISSOURI	52.42	47.87
MONTANA	N.A.	N.A.
NEBRASKA	38.45	97.14
NEVADA	1.79	25.00
NEW HAMPSHIRE	40.83	49.25
NEW JERSEY	24.53	38.54
NEW MEXICO	17.48	54.87
NEW YORK	35.41	67.58
NORTH CAROLINA	27.71	20.69
NORTH DAKOTA	34.64	44.05
OHIO	65.21	79.26
OKLAHOMA	30.00	46.70
OREGON	72.58	61.96
PENNSYLVANIA	53.08	68.61
RHODE ISLAND	37.36	31.03
SOUTH CAROLINA	30.83	34.78
SOUTH DAKOTA	26.79	38.64
TENNESSEE	44.88	59.96
TEXAS	37.36	54.71
UTAH	25.11	57.99
VERMONT	38.41	64.64
VIRGINIA	58.72	56.06
WASHINGTON	44.77	48.20
WEST VIRGINIA	25.58	32.73
WISCONSIN	35.73	30.00
WYOMING	78.05	68.47
PUERTO RICO	N/A	N/A

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

Data on full-time teachers per 1,000 pupils show a wide range of variation on the distribution of this resource also; differences between high (95th percentile) and low (5th percentile) systems increased between 1969-70 and 1976-77 for all but 8 States, for which the range decreased (table 3.14). Chart 3.5 underscores the variation in this resource both across and within States.

Measures of Dispersion for Within State Distributions

Several dispersion measures of the resource distributions for school systems within States were calculated using both school system averages and school system averages weighted by numbers of pupils. These dispersion measures provide more detailed characterizations of State wide distributions. Dispersion measures for system averages indicate the disparity of system average expenditures from the State average of all system averages. Measures for weighted system averages show the disparity of resource distributions among pupils in each State, under the admittedly artificial assumption that each pupil in a system receives the average amount of resources for that system. Shown in addition to the State averages are the coefficient of variation, the Gini coefficient, and the Theil coefficient. Chapter 6 describes these measures in detail; the essential aspects of the Gini coefficient and the Theil coefficient, which have not been presented before, are noted here.

The Gini Coefficient gives a measure of the concentration of a distribution. It presents a joint cumulative distribution of the percentiles of units of observation (for example, pupils) against percentiles of the factors being examined (for example, expenditures), to measure the extent to which equal percentiles receive equal shares. The greater the disparities in the distribution, the higher the value of the index, which can range from 0 to 1 or when multiplied by 100, from 0 to 100. If each percentile of pupils received

TABLE 3.14

NUMBER OF CLASSROOM TEACHERS PER 1,000 PUPILS, BY STATE: 1969-70 AND 1976-77

(ESTIMATES FOR SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	AVERAGE, 5TH PERCENTILE, AND 95TH PERCENTILE LEVELS OF CLASSROOM TEACHERS PER 1,000 PUPILS AND THE DIFFERENCE BETWEEN THE 5TH AND 95TH PERCENTILES							
	1976-77 1/				1969-70			
	AVERAGE (MEAN)	5TH PER-CENTILE	95TH PER-CENTILE	DIFFER-ENCE: 95TH -5TH	AVERAGE (MEAN)	5TH PER-CENTILE	95TH PER-CENTILE	DIFFER-ENCE: 95TH -5TH
ALABAMA	39.2	26.0	47.5	21.5	40.1	36.1	45.9	9.8
ALASKA	43.7	38.5	55.6	17.1	45.1	39.8	52.9	13.1
ARIZONA	37.5	26.3	54.0	27.7	N.S.	N.S.	N.S.	N.S.
ARKANSAS	43.5	36.4	54.0	17.6	38.8	31.6	47.1	15.5
CALIFORNIA	38.4	33.1	45.8	12.7	35.8	26.8	43.2	16.4
COLORADO	45.4	36.8	61.2	24.3	43.1	38.6	46.4	7.8
CONNECTICUT	48.4	41.9	58.2	16.3	49.4	43.1	55.8	12.7
DELAWARE	50.5	46.0	55.5	9.5	45.4	43.3	47.5	4.2
DISTRICT OF COLUMBIA 2/	48.1	48.1	48.1	0.0	47.7	47.7	47.7	0.0
FLORIDA	43.3	38.5	49.3	10.8	42.6	36.8	47.8	11.0
GEORGIA	40.5	34.1	48.0	13.9	39.4	35.8	46.7	10.8
HAWAII 2/	45.2	45.2	45.2	0.0	41.0	41.0	41.0	0.0
IDAHO	43.1	37.6	52.4	14.8	41.8	37.8	51.1	13.3
ILLINOIS	41.9	34.6	55.9	20.5	N.C.	N.C.	N.C.	N.C.
INDIANA	42.4	35.9	50.0	14.1	44.0	40.3	50.5	10.2
IOWA	48.9	38.0	63.5	25.6	47.9	39.7	61.8	22.0
KANSAS	51.5	41.2	75.0	33.8	49.8	42.8	62.0	19.2
KENTUCKY	46.1	40.4	52.9	12.5	42.7	39.4	45.6	6.2
LOUISIANA	41.4	34.3	50.2	16.0	43.8	39.9	49.5	9.6
MAINE	47.2	40.5	56.5	15.9	47.0	40.6	59.8	19.2
MARYLAND	41.5	35.5	46.8	11.3	43.1	40.6	47.3	6.8
MASSACHUSETTS	49.3	40.7	56.6	15.9	46.7	36.0	57.5	21.6
MICHIGAN	37.9	32.6	46.4	13.8	40.5	34.8	46.6	11.8
MINNESOTA	43.9	35.7	56.4	20.7	44.5	34.8	51.9	18.0
MISSISSIPPI	45.2	38.9	52.9	14.1	42.2	34.9	48.2	13.3
MISSOURI	44.9	36.1	58.3	22.2	43.6	36.8	68.3	32.4
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	55.1	42.5	98.7	56.2	45.7	36.4	63.0	26.6
NEVADA	36.0	32.7	50.2	17.5	38.5	37.7	40.8	3.1
NEW HAMPSHIRE	48.3	32.6	55.5	22.9	49.1	45.9	56.9	11.0
NEW JERSEY	50.6	40.9	60.4	19.4	44.4	37.2	52.5	15.3
NEW MEXICO	44.0	39.9	53.9	14.0	41.8	37.1	58.4	21.3
NEW YORK	45.1	37.4	55.1	17.6	43.1	38.4	49.6	11.2
NORTH CAROLINA	41.1	35.9	47.1	11.2	39.7	36.4	42.7	6.3
NORTH DAKOTA	48.1	35.2	62.3	27.1	48.1	33.9	66.0	26.1
OHIO	41.7	33.2	58.1	16.8	N.C.	N.C.	N.C.	N.C.
OKLAHOMA	45.3	37.7	60.3	22.7	39.6	36.3	47.8	11.5
OREGON	45.6	38.4	55.1	16.7	45.8	41.5	55.1	13.5
PENNSYLVANIA	47.3	37.7	55.7	18.1	44.2	38.4	53.2	14.7
RHODE ISLAND	47.6	40.7	53.9	13.2	45.9	42.0	51.7	9.7
SOUTH CAROLINA	41.8	37.9	47.2	9.3	38.8	35.3	43.0	7.7
SOUTH DAKOTA	47.8	24.9	65.1	40.2	50.3	43.1	68.1	25.0
TENNESSEE	40.4	34.4	46.1	11.7	38.5	32.7	43.5	10.7
TEXAS	44.6	5.1	56.5	21.4	38.0	33.8	47.9	14.2
UTAH	36.4	33.4	43.3	13.8	37.0	34.0	39.4	5.5
VERMONT	53.7	42.5	66.2	23.6	63.2	53.5	85.9	32.4
VIRGINIA	44.6	35.8	51.8	16.8	43.5	37.9	48.4	10.5
WASHINGTON	37.8	30.5	45.2	14.6	41.0	36.9	44.5	7.7
WEST VIRGINIA	44.9	39.3	51.6	12.3	41.9	38.2	46.5	8.3
WISCONSIN	45.6	37.3	55.1	17.8	44.0	38.3	53.7	15.4
WYOMING	54.5	42.9	76.9	34.0	51.2	44.4	102.3	57.9

N.A. =NOT APPLICABLE
N.C. =NOT COMPUTED
N.S. =NOT SAMPLED

1/ SCHOOL SYSTEMS WITH LESS THAN 15 EMPLOYEES NOT SAMPLED.

2/ NCES ESTIMATE.

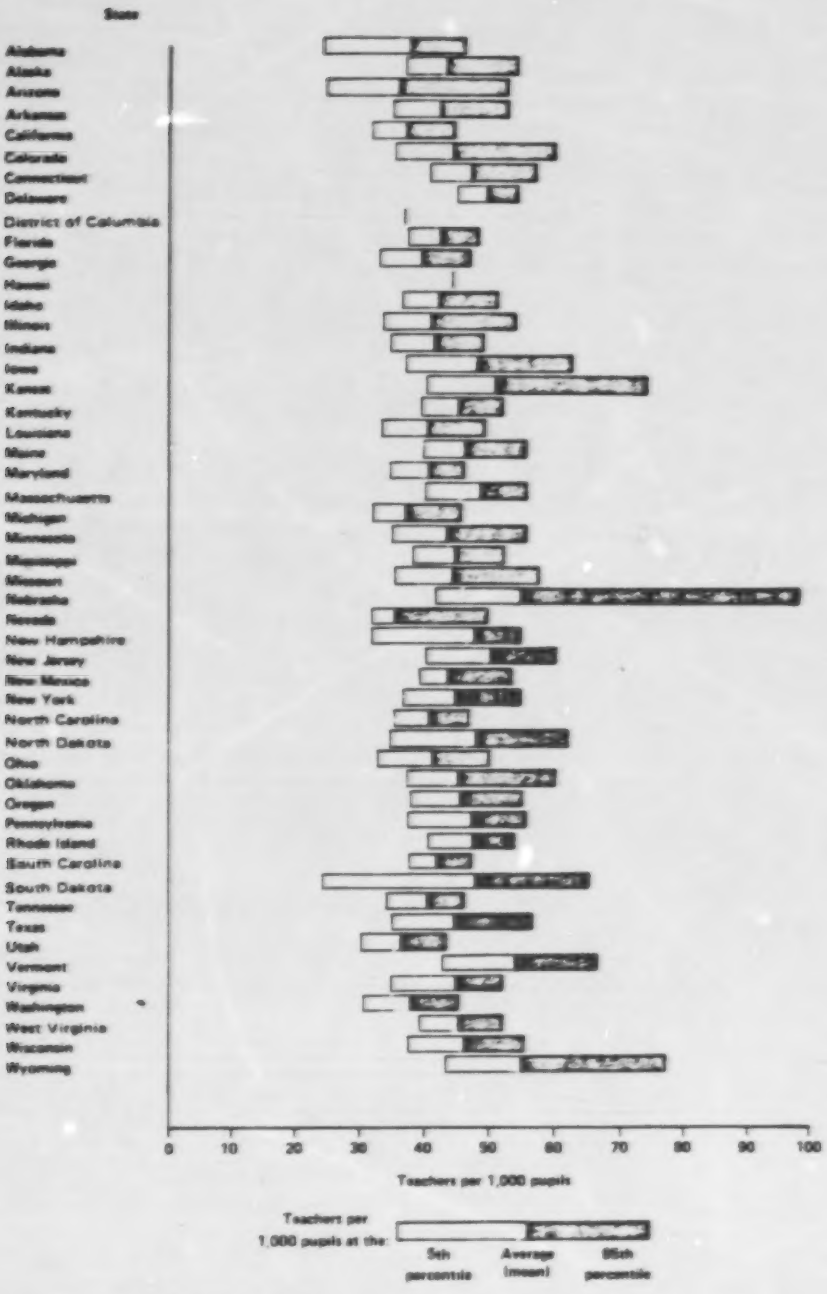
NOTES: UNIVERSE ESTIMATES FOR BOTH YEARS ARE FROM A NATIONAL RANDOM SAMPLE STRATIFIED BY ENROLLMENT SIZE OF SCHOOL SYSTEMS ADJUSTED AND WEIGHTED FOR SCHOOL SYSTEMS WITH GRADES 1-12. ESTIMATES ARE SUBJECT TO SAMPLING ERROR. SEE CHAPTER 7 FOR DEFINITIONS OF TEACHERS AS USED IN THIS REPORT.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT DATA FILE.

Chart 3.5

Elementary and Secondary Education Classroom Teachers Per 1,000 Pupils, by State: 1976-77

(For School Systems with grades 1-12)



Source: Table 3.14

the same percentile of expenditures, the Gini index would be zero. In contrast to the coefficient of variation, the Gini coefficient is less sensitive to changes in extremes of a distribution and more sensitive to changes about the middle.

The Theil Coefficient also gives a measure of the dispersion of a distribution. The statistic, is, however, more sensitive to shifts in resources from one recipient to another at lower values. This property renders the measure particularly useful in considering resource disparities, where one might argue that differences become somewhat less important as values increase. The range of the statistic is 0 to natural log of the number of pupils or number of school systems. Merely increasing or decreasing the number of pupils or school systems will not change the value unless such a change affects the distribution of resources. The upper bound is only obtained when one pupil or one school system has all the resources.

The dispersion measures for core expenditure, calculated using unweighted system averages and using system averages weighted by enrollments, are shown by State for 1976-77 in table 3.15. In most cases, weighting of school system values by numbers of students enrolled had similar effects on the dispersion measures. Values for 21 States stayed virtually the same for both the coefficient of variation and Theil coefficient; for 17 States, both measures decreased when system values were weighted, and for 3 States — Kentucky, Massachusetts and Minnesota -- both measures increased when weighted. The Theil coefficient was more likely to change with pupil weightings than was the coefficient of variation. For 7 States, the coefficient of variation showed no appreciable change when weightings were added but the Theil Coefficient increased for 6 of those States, and decreased for one.

TABLE 3.19

SELECTED MEASURES OF DISPERSION OF CORE CURRENT EDUCATION EXPENDITURE FOR SCHOOL SYSTEMS BY STATE: 1976-77

(INCLUDES ONLY PUPILS IN SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	SCHOOL SYSTEM AVERAGES				SCHOOL SYSTEM AVERAGES WEIGHTED BY ENROLLMENT			
	MEAN	COEFFICIENT OF VARIATION (X100)	GINI COEFFICIENT (X100)	THEIL COEFFICIENT (X1000)	MEAN	COEFFICIENT OF VARIATION (X100)	GINI COEFFICIENT (X100)	THEIL COEFFICIENT (X1000)
ALABAMA	743.	17.1	6.7	7.1	797.	12.2	6.8	7.3
ALASKA	3230.	25.2	14.3	31.5	2496.	23.0	10.9	24.0
ARIZONA	1319.	24.8	12.8	29.3	1214.	14.0	6.4	9.0
ARKANSAS	805.	19.8	10.5	18.3	813.	10.1	10.0	15.8
CALIFORNIA	1578.	23.4	10.6	23.2	1522.	14.0	7.1	9.4
COLORADO	1961.	30.8	15.9	42.7	1438.	17.8	9.4	14.7
CONNECTICUT	1378.	18.0	8.9	15.7	1444.	18.6	10.3	16.9
DELAWARE	1296.	19.8	10.5	18.6	1361.	22.6	11.7	23.8
DIST OF COLUMBIA	1914.	0.0	0.0	0.0	1914.	0.0	0.0	0.0
FLORIDA	1196.	13.2	6.7	8.2	1256.	12.1	6.7	7.1
GEORGIA	854.	19.8	8.9	13.3	952.	19.4	10.8	18.3
HAWAII	1959.	0.0	0.0	0.0	1559.	0.0	0.0	0.0
IDAHO	1060.	22.9	11.6	23.6	962.	14.9	7.7	10.3
ILLINOIS	1198.	18.4	8.5	12.6	1364.	17.4	9.7	15.4
INDIANA	987.	15.3	8.0	11.1	1049.	15.7	9.0	12.2
IOWA	1402.	9.8	5.3	4.7	1377.	7.3	4.0	9.6
KANSAS	1317.	22.1	11.7	23.1	1229.	14.4	7.4	10.0
KENTUCKY	786.	13.1	6.7	8.1	849.	21.0	11.1	20.8
LOUISIANA	919.	13.5	7.5	9.0	946.	12.0	6.8	7.2
MAINE	1068.	18.9	9.2	16.1	1038.	15.0	8.2	10.9
MARYLAND	1402.	13.5	7.2	8.7	1364.	14.7	8.0	10.5
MASSACHUSETTS	1335.	18.8	9.8	16.7	1456.	24.9	12.5	28.4
MICHIGAN	1211.	19.0	9.8	16.5	1353.	20.3	10.6	19.5
MINNESOTA	1306.	14.7	7.6	10.1	1363.	18.6	9.9	16.3
MISSISSIPPI	798.	13.3	6.8	7.4	911.	14.6	8.0	10.2
MISSOURI	991.	20.5	9.8	18.5	1108.	23.4	12.2	25.2
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1609.	27.2	14.5	34.4	1386.	18.1	8.7	14.8
NEVADA	1422.	24.5	10.7	25.6	1216.	7.5	3.0	2.4
NEW HAMPSHIRE	1041.	18.2	8.9	12.8	1049.	13.9	7.7	9.8
NEW JERSEY	1431.	16.6	8.9	12.5	1609.	19.1	9.4	11.3
NEW MEXICO	1437.	24.1	11.8	27.3	1186.	13.2	5.9	7.9
NEW YORK	2004.	27.7	13.5	33.3	2210.	19.8	10.6	19.3
NORTH CAROLINA	1004.	11.4	6.1	6.3	1003.	12.1	6.6	7.2
NORTH DAKOTA	1276.	19.8	10.3	18.0	1207.	16.2	8.3	12.3
OHIO	1080.	25.9	12.2	27.9	1199.	22.9	13.8	25.4
OKLAHOMA	1019.	27.5	13.0	32.8	936.	17.2	7.9	12.9
OREGON	1606.	18.1	9.5	15.5	1599.	11.4	6.4	6.5
PENNSYLVANIA	1294.	18.5	9.7	16.1	1376.	20.9	11.7	21.3
RHODE ISLAND	1444.	17.9	8.9	14.7	1444.	13.6	7.7	9.3
SOUTH CAROLINA	819.	13.1	7.1	8.4	945.	13.6	7.4	9.0
SOUTH DAKOTA	1138.	19.9	10.0	18.3	1058.	18.0	9.1	16.2
TENNESSEE	767.	20.4	10.0	19.0	881.	22.7	12.8	25.4
TEXAS	1146.	31.4	15.8	43.0	1066.	18.1	9.3	15.1
UTAH	1188.	20.4	10.7	19.2	1052.	9.7	4.7	4.4
VERMONT	1264.	18.6	10.6	17.1	1316.	16.5	9.2	14.0
VIRGINIA	1629.	21.9	9.9	20.6	1122.	24.3	12.7	27.3
WASHINGTON	1601.	30.0	14.9	37.1	1383.	18.4	10.2	16.5
WEST VIRGINIA	1031.	18.3	9.7	9.2	1014.	9.7	5.5	4.7
WISCONSIN	1373.	13.7	6.9	7.3	1449.	14.4	8.1	10.2
WYOMING	1960.	16.9	9.2	13.3	1426.	15.0	8.1	10.7
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS.
SPECIAL TABULATIONS FROM MERGED SCHOOL DISTRICT FILE.

To shift the focus of the analysis to an exploration of characteristics of the dispersions of school system averages, a variety of calculations were performed using the system values weighted by the number of pupils enrolled. Because of its greater sensitivity to differences among lower values, the Theil coefficient was used in these computations. The resulting presentations have the added advantage of providing more familiarity with the Theil coefficient, which is believed to be methodologically preferable to the other measures.

The Theil coefficient can be decomposed to show among and within group dispersion. Decomposition of national Theil coefficients computed on the school system data base provides important insights into comparative features of the resource distributions. Allocation of national dispersion to among and within-State shares for core expenditure for 1976-77 and 1969-70 is shown in table 3.16; analogous results for teacher-pupil ratios are shown in table 3.17. It should first be observed that total dispersions nationally for the two years for core expenditure are greater than those for teachers. The fact that, nationally, expenditure dispersions are greater than the dispersions for the largest single component of those expenditures by a factor of four suggests that real cost of living differences, probably reflected in teacher salaries, are responsible for a major portion of the observed expenditure variation.

Decomposition of the Theil coefficient for expenditure shows that almost two thirds of the total variation nationally is explained by among State dispersion, one third by within State dispersion. Thus the State mean is of considerable explanatory value in establishing the expenditure level for systems within that State. The reverse of the decomposition of expenditure dispersion is true for teacher dispersion: more than twice as much of the teacher variation is explained by within State dispersion than is explained by among State dispersions.

TABLE 3.16

DECOMPOSITION OF THEIL COEFFICIENT OF DISPERSION OF CORE CURRENT EXPENDITURE PER PUPIL: UNITED STATES, 1969-70 AND 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

	THEIL COEFFICIENTS 1969-70 (X 1000)	1976-77 (X 1000)
TOTAL UNITED STATES	45.8	30.4
AMONG STATES	30.0	14.9
WITHIN STATES	15.8	15.5

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED SCHOOL DISTRICT DATA FILE.

TABLE 3.17

DECOMPOSITION OF THEIL COEFFICIENT OF DISPERSION OF TEACHERS PER 1,000 PUPILS: UNITED STATES, 1969-70 AND 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

	THEIL COEFFICIENTS 1969-70 (X 1000)	1976-77 (X 1000)
TOTAL UNITED STATES	10.0	11.9
AMONG STATES	3.6	3.5
WITHIN STATES	6.4	8.4

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED SCHOOL DISTRICT DATA FILE.

Measures of dispersion for each State calculated on these weighted distributions also permitted graphic comparisons of distributions of alternative resource measures and changes in distributions over time. Dispersion measures used in these comparisons are provided in tables 3.18 through 3.20. Table 3.18 presents the dispersion measures by State on core expenditure for 1976-77 and 1969-70. Table 3.19 provides analogous measures for classroom teachers. Table 3.20 shows dispersion measures by State for total expenditure. Total expenditure dispersion measures are shown for 1976-77 only, because comparable data for prior years were not available.

Comparisions of statistical measures of within-State dispersions on core expenditure and teachers suggest some of the reasons for observed resource differences. The national average within-State dispersion may be used to partition the States into four groups, based on their relation to the national average on each of the two resource distributions. This exhibit of Theil coefficients is shown in Chart 3.6. Seventeen States (those in the lower left-hand corner of the chart) had both expenditure and staffing dispersions less than the national average of within-State dispersions; in other words, this group showed greater equalization than the national averages on both resource measures. At the other extreme, seven States (those in the upper right-hand corner) exceeded the national average in dispersions for both resource measures. Remaining States exceeded the national average on one measure and were less than average on the other. Fourteen States showed comparatively larger expenditure dispersion and smaller teacher dispersion, while 10 States exhibited the reverse pattern, with larger teacher dispersion than expenditure dispersion.

TABLE 5.18

SELECTED MEASURES OF DISPERSION OF CONS CURRENT EDUCATION EXPENDITURE PER PUPIL, BY STATE: 1969-70 AND 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12. SCHOOL SYSTEM AVERAGES WEIGHTED BY ENROLLMENT)

STATE OR OTHER AREA	1976-77				1969-70			
	RATIO OF 95TH TO 5TH PERCENTILE	COEFFICIENT OF VARIATION (X100)	GINI COEFFICIENT (X100)	THEIL COEFFICIENT (X1000)	RATIO OF 95TH TO 5TH PERCENTILE	COEFFICIENT OF VARIATION (X100)	GINI COEFFICIENT (X100)	THEIL COEFFICIENT (X1000)
ALABAMA	1.5	12.2	6.8	7.3	1.5	9.7	5.2	4.6
ALASKA	1.8	23.3	10.9	24.3	1.4	14.1	7.5	9.7
ARIZONA	1.4	14.3	6.4	9.3	1.3	8.8	4.4	3.8
ARKANSAS	1.8	18.1	10.0	15.8	1.7	17.4	9.1	14.3
CALIFORNIA	1.5	14.0	7.1	9.4	1.6	20.9	8.6	17.4
COLORADO	1.7	17.6	9.4	14.7	1.5	15.5	8.7	12.7
CONNECTICUT	1.8	18.6	10.3	16.9	2.3	23.7	12.9	21.6
DELAWARE	2.0	22.6	11.7	25.8	1.7	15.2	8.5	12.4
DISTRICT OF COLUMBIA	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
FLORIDA	1.4	12.1	6.7	7.1	1.5	12.5	6.9	7.5
GEORGIA	1.9	19.4	10.8	18.7	1.7	16.9	9.8	15.1
HAWAII	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
IDAHO	1.5	14.7	7.7	10.3	1.5	11.5	6.2	6.6
ILLINOIS	1.8	17.4	9.7	15.4	1.6	18.3	9.2	20.9
INDIANA	1.6	15.7	8.8	12.2	1.6	18.6	8.7	14.8
IOWA	1.3	7.3	4.3	2.6	1.3	19.2	9.1	18.8
KANSAS	1.5	14.4	7.4	13.3	1.5	15.1	7.2	14.3
KENTUCKY	1.8	21.0	11.1	20.8	1.7	17.9	9.6	13.7
LOUISIANA	1.5	12.8	6.8	7.2	1.4	9.5	5.1	4.4
MAINE	1.6	15.8	8.2	10.9	1.8	18.1	9.3	20.2
MARYLAND	1.6	14.7	8.0	10.9	1.6	12.9	6.8	8.6
MASSACHUSETTS	2.2	24.9	12.5	28.4	1.8	17.2	9.4	14.3
MICHIGAN	1.8	20.5	10.6	19.5	1.8	18.8	10.2	16.8
MINNESOTA	1.9	18.6	9.9	16.5	1.5	12.7	7.1	8.3
MISSISSIPPI	1.7	14.6	8.0	10.2	1.6	15.2	8.8	11.7
MISSOURI	1.8	23.4	12.2	29.3	1.8	20.4	11.4	28.1
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1.7	18.1	9.7	14.8	1.6	16.5	8.2	13.4
NEVADA	1.1	7.5	2.8	2.4	1.2	7.8	2.8	2.7
NEW HAMPSHIRE	1.8	13.9	7.7	9.6	1.5	11.6	6.1	6.8
NEW JERSEY	1.7	19.1	9.4	11.3	1.6	14.9	8.3	10.7
NEW MEXICO	1.5	13.2	5.9	7.9	1.4	12.9	5.6	7.5
NEW YORK	1.8	19.8	10.8	19.3	1.6	14.9	7.9	10.4
NORTH CAROLINA	1.4	12.1	6.6	7.2	1.4	10.1	5.7	5.1
NORTH DAKOTA	1.6	16.2	8.9	12.3	1.5	14.2	7.5	9.6
OHIO	1.9	22.9	12.3	25.4	1.9	21.7	12.1	22.9
OKLAHOMA	1.5	17.2	7.9	12.9	1.5	19.7	9.3	22.5
OREGON	1.4	11.4	6.4	6.5	1.4	8.5	4.8	3.9
PENNSYLVANIA	1.8	20.9	11.7	23.9	1.7	21.6	11.2	26.9
RHODE ISLAND	1.5	13.6	7.7	9.3	1.8	18.9	10.2	17.8
SOUTH CAROLINA	1.6	13.6	7.4	9.8	1.4	8.7	4.8	5.9
SOUTH DAKOTA	1.9	18.0	9.1	16.2	1.4	14.1	6.8	9.6
TENNESSEE	1.9	22.7	12.8	25.4	1.7	18.2	10.3	16.4
TEXAS	1.7	18.1	9.5	15.1	1.7	15.9	8.3	11.8
UTAH	1.3	9.7	4.7	4.4	1.3	8.9	4.1	3.6
VERMONT	1.8	16.5	9.3	14.3	2.4	22.6	11.8	27.7
VIRGINIA	1.8	24.5	12.7	27.5	1.7	24.6	12.8	31.6
WASHINGTON	1.8	18.4	10.2	16.9	1.6	16.9	9.8	12.7
WEST VIRGINIA	1.3	9.7	5.5	4.7	1.3	10.5	5.9	5.4
WISCONSIN	1.5	14.4	8.1	10.2	1.5	11.8	6.5	7.3
WYOMING	1.5	15.8	8.1	10.7	1.6	15.9	8.5	15.9

N.A. = NOT APPLICABLE

NOTES: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED DISTRICT DATA FILE.

TABLE 3.19

SELECTED MEASURES OF DISPERSION OF CLASSROOM TEACHERS PER 1,000 PUPILS, BY STATE: 1969-70 AND 1976-77

(FOR SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	1976-77				1969-70			
	RATIO OF 95TH TO 5TH PERCENTILE	COEFFICIENT OF VARIATION (A108)	GINI COEFFICIENT (A105)	THEIL COEFFICIENT (A1000)	RATIO OF 95TH TO 5TH PERCENTILE	COEFFICIENT OF VARIATION (A108)	GINI COEFFICIENT (A105)	THEIL COEFFICIENT (A1000)
ALABAMA	1.8	10.8	6.2	11.7	2.3	6.8	3.8	2.2
ALASKA	1.4	16.4	8.5	19.1	1.8	12.8	6.4	7.2
ARIZONA	2.1	21.7	11.2	21.5	N.S.	N.S.	N.S.	N.S.
ARKANSAS	1.5	12.8	6.7	7.9	1.5	11.8	6.7	6.5
CALIFORNIA	1.4	10.2	5.1	5.1	1.6	20.8	9.6	22.1
COLORADO	1.7	18.4	9.4	15.7	1.2	10.2	3.5	4.7
CONNECTICUT	1.4	10.5	5.8	5.6	1.3	7.8	4.5	3.1
DELAWARE	1.2	16.8	6.1	12.2	1.1	4.5	2.3	1.1
DISTRICT OF COLUMBIA	1.8	0.0	0.0	0.0	1.5	0.0	0.0	0.0
FLORIDA	1.3	8.1	4.6	3.7	1.3	7.7	4.1	3.0
GEORGIA	1.4	11.4	5.2	5.6	1.3	7.9	4.2	3.5
HAWAII	1.8	9.8	0.0	0.0	1.8	0.0	0.0	0.0
IDAHO	1.4	11.2	5.9	6.8	1.4	10.5	5.6	5.4
ILLINOIS	1.6	14.3	7.1	10.3	N.C.	N.C.	N.C.	N.C.
INDIANA	1.4	12.8	6.2	7.9	1.3	10.3	4.7	4.3
IOWA	1.7	15.9	8.3	12.2	1.6	14.1	7.2	9.4
KANSAS	1.8	21.2	9.8	18.3	1.4	14.1	7.4	9.5
KENTUCKY	1.3	17.7	5.4	11.8	1.2	4.5	2.6	2.8
LOUISIANA	1.5	11.2	6.1	6.5	1.3	6.1	3.4	1.9
MAINE	1.4	9.9	5.3	4.8	1.5	12.9	6.6	7.9
MARYLAND	1.3	8.3	4.0	3.4	1.2	3.2	2.0	1.3
MASSACHUSETTS	1.4	9.7	5.3	4.9	1.6	13.2	7.5	8.7
MICHIGAN	1.4	11.7	6.5	6.9	1.3	10.8	5.4	5.5
MINNESOTA	1.6	14.7	7.9	10.6	1.5	11.5	6.2	6.6
MISSISSIPPI	1.4	8.7	5.3	4.7	1.4	8.9	5.1	4.3
MISSOURI	1.8	17.4	8.7	14.3	1.9	10.5	5.2	10.8
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1.3	24.3	11.5	25.8	1.7	21.1	11.2	22.4
NEVADA	1.3	10.3	6.3	11.6	1.1	3.6	1.6	0.6
NEW HAMPSHIRE	1.7	11.1	6.8	6.5	1.3	10.3	5.3	5.2
NEW JERSEY	1.3	11.4	6.2	6.5	1.4	21.3	3.9	48.4
NEW MEXICO	1.4	14.3	6.3	9.5	1.4	12.7	6.8	7.5
NEW YORK	1.5	12.4	6.4	7.4	1.3	13.4	6.8	14.8
NORTH CAROLINA	1.3	8.5	4.7	3.7	1.2	5.5	3.1	1.5
NORTH DAKOTA	1.8	18.8	10.2	18.6	1.7	13.9	7.8	8.7
OHIO	1.5	13.1	7.8	8.6	N.C.	N.C.	N.C.	N.C.
OKLAHOMA	1.6	16.8	8.6	12.5	1.3	13.5	6.8	17.8
OREGON	1.4	12.4	6.3	7.5	1.3	13.4	5.7	8.1
PENNSYLVANIA	1.5	12.8	7.1	8.2	1.4	9.6	5.4	4.6
RHODE ISLAND	1.3	7.7	4.3	3.8	1.2	8.5	4.6	3.6
SOUTH CAROLINA	1.2	7.5	4.8	2.8	1.2	6.1	3.5	1.9
SOUTH DAKOTA	1.6	23.5	12.3	25.3	1.6	13.4	6.8	8.5
TENNESSEE	1.3	9.7	5.5	4.7	1.3	8.6	4.9	3.7
TEXAS	1.6	16.5	8.1	12.7	1.4	11.7	5.9	5.4
UTAH	1.4	13.8	6.6	7.9	1.2	4.3	2.1	1.3
VERMONT	1.6	23.8	7.3	8.3	1.6	24.9	7.6	18.7
VIRGINIA	1.3	10.3	5.7	5.3	1.3	7.2	3.8	2.9
WASHINGTON	1.5	12.9	6.8	8.1	1.2	9.5	4.8	4.3
WEST VIRGINIA	1.3	9.8	5.1	4.1	1.2	6.2	3.3	1.9
WISCONSIN	1.5	18.3	7.6	14.5	1.4	12.8	6.7	7.2
WYOMING	1.8	21.9	11.8	22.1	2.3	38.5	9.6	36.3

N.A. = NOT APPLICABLE
N.C. = NOT COMPUTED
N.S. = NOT SAMPLED

NOTES: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED DISTRICT DATA FILE.

TABLE 3.28

SELECTED MEASURES OF DISPARITIES IN TOTAL EDUCATION EXPENDITURES PER PUPIL, BY STATE: 1976-77

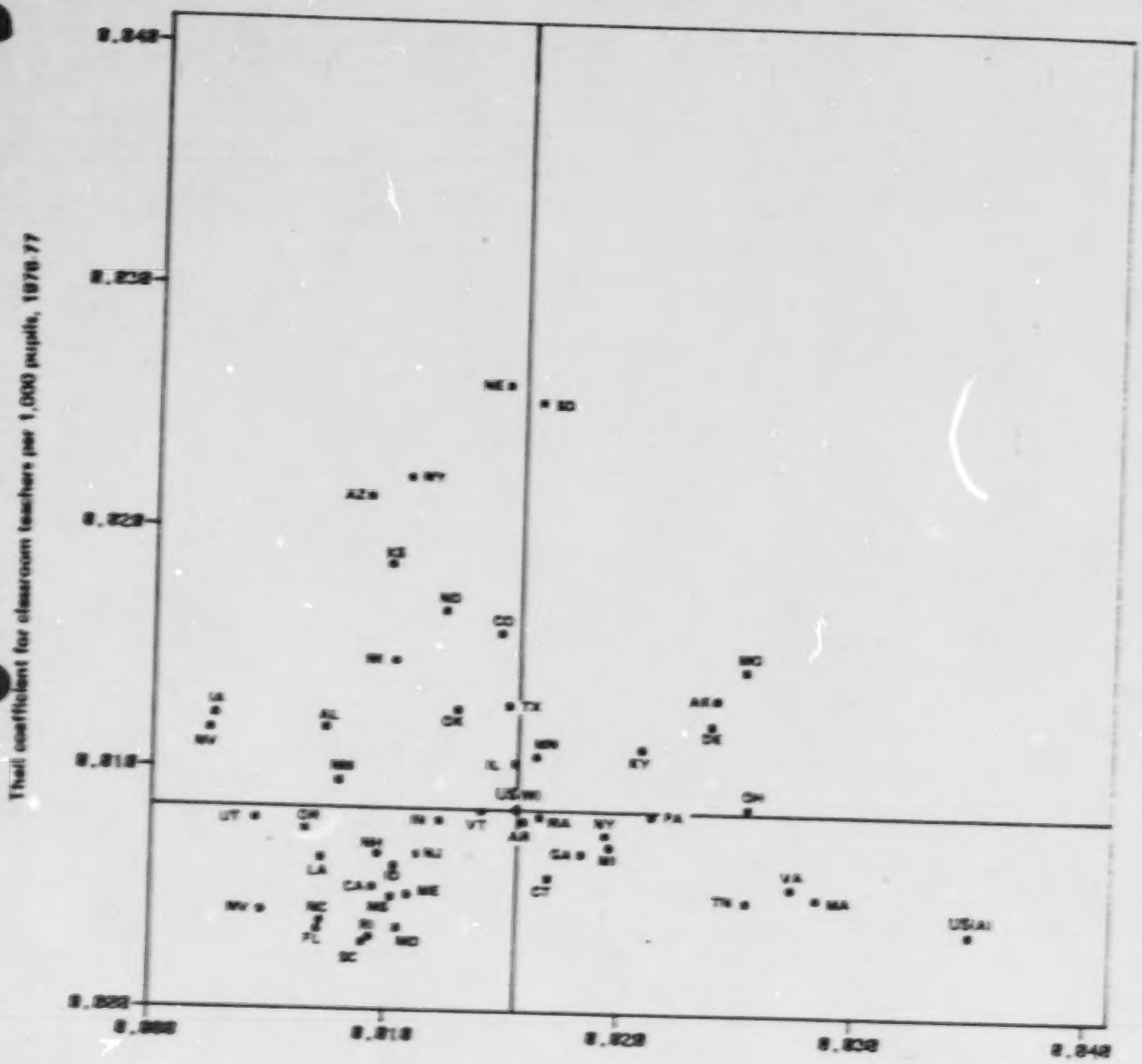
(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	RATIO OF 95TH TO 5TH PER-CENTILE	COEFFI-CIENT OF VARIA-TION (1980)	GINI COEFFI-CIENT (1980)	THEIL COEFFI-CIENT (1980)
ALABAMA	1.4	14.6	7.6	10.1
ALASKA	1.8	30.6	15.4	36.6
ARIZONA	1.7	27.4	14.5	29.1
ARKANSAS	1.7	19.6	10.1	17.9
CALIFORNIA	1.7	17.1	8.8	13.8
COLORADO	1.8	20.8	13.1	23.6
CONNECTICUT	2.3	21.2	11.4	21.4
DELAWARE	1.8	19.8	9.8	16.9
DIST OF COLUMBIA	1.3	0.0	0.0	0.0
FLORIDA	1.6	13.5	6.8	7.5
GEORGIA	1.7	18.2	10.1	16.2
GUAM	1.3	0.0	0.0	0.0
HAWAII	1.5	19.4	8.2	15.8
ILLINOIS	1.8	25.6	11.6	21.8
INDIANA	1.7	16.5	8.8	13.2
IOWA	1.4	13.8	5.7	8.2
KANSAS	1.7	19.1	9.8	16.3
KENTUCKY	1.7	23.3	12.3	25.4
LOUISIANA	1.6	16.8	8.7	12.1
MAINE	2.3	29.8	13.8	34.8
MARYLAND	1.5	11.6	6.1	6.7
MASSACHUSETTS	2.1	28.4	14.1	36.8
MICHIGAN	1.8	27.1	14.7	28.2
MINNESOTA	1.9	22.7	10.6	23.3
MISSISSIPPI	1.6	15.8	8.3	10.9
MISSOURI	1.8	20.7	11.2	20.6
MONTANA	2.3	0.0	0.0	0.0
NEBRASKA	1.8	23.6	10.5	23.8
NEVADA	1.3	12.1	5.9	6.8
NEW HAMPSHIRE	1.8	17.9	9.9	15.5
NEW JERSEY	1.6	14.9	8.1	10.3
NEW MEXICO	1.7	24.3	9.1	27.9
NEW YORK	1.8	19.8	10.7	19.3
NORTH CAROLINA	1.5	14.3	7.5	9.6
NORTH DAKOTA	1.8	23.3	10.6	23.3
OHIO	2.6	31.4	14.7	44.8
OKLAHOMA	1.7	19.9	9.8	17.1
OREGON	1.8	22.7	9.9	21.7
PENNSYLVANIA	1.8	21.2	10.1	22.8
RHODE ISLAND	1.5	13.8	7.6	8.5
SOUTH CAROLINA	1.6	17.2	9.6	14.3
SOUTH DAKOTA	2.5	28.1	12.9	32.9
TENNESSEE	1.8	19.7	11.2	19.3
TEXAS	2.1	28.8	11.8	31.8
UTAH	1.6	22.4	10.9	21.2
VERMONT	1.8	13.9	7.8	9.7
VIRGINIA	1.9	23.8	12.6	24.6
WASHINGTON	1.8	18.7	10.1	16.9
WEST VIRGINIA	1.6	15.3	8.6	11.5
WISCONSIN	1.5	15.6	8.3	11.6
WYOMING	2.2	27.2	13.5	33.1
PUERTO RICO	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED SCHOOL DISTRICT FILE.

Chart 3.6
Theil Coefficients for Core Current Expenditure and Classroom Teachers, by State: 1976-77

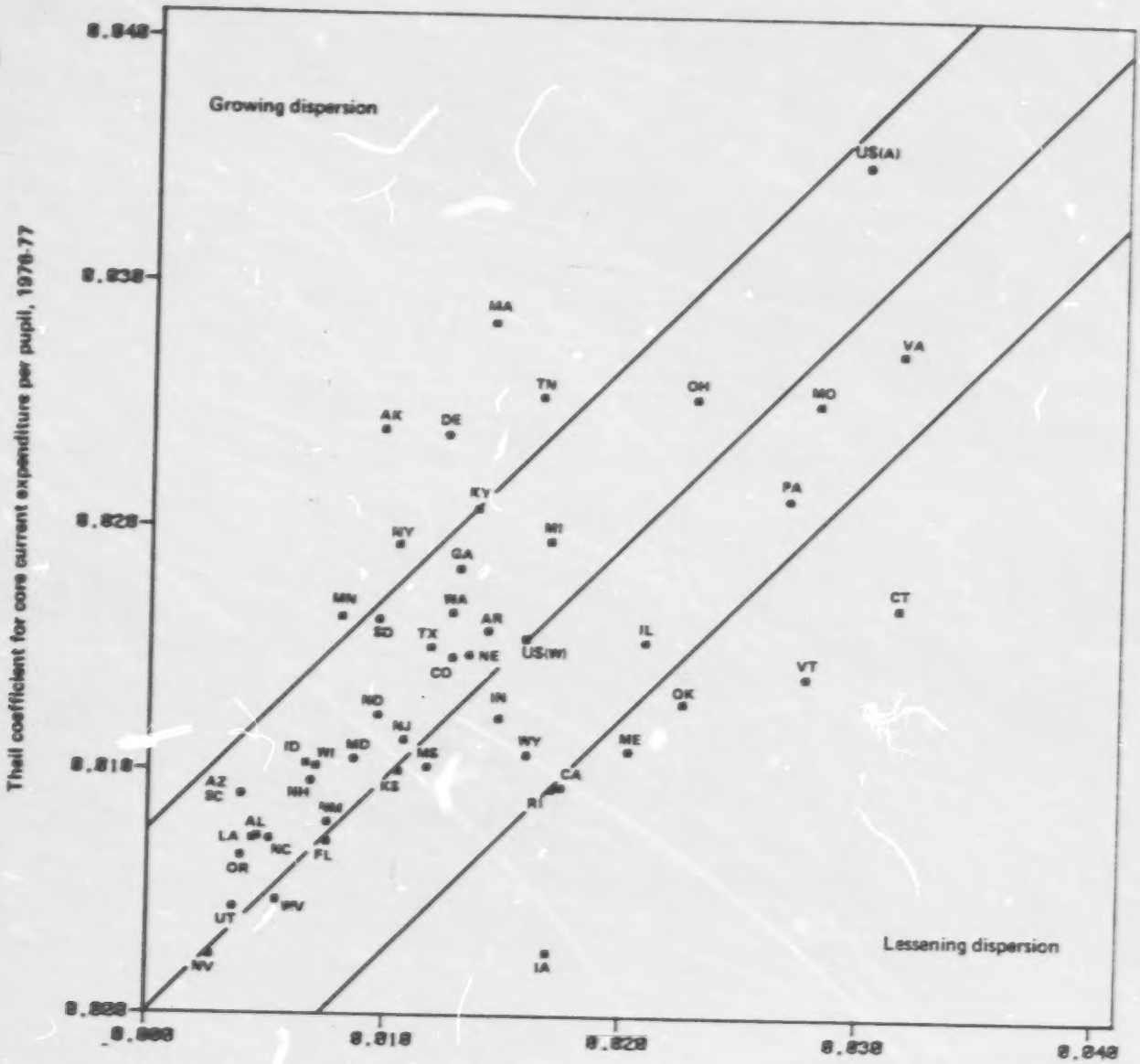


Sources: Tables 3.18 and 3.19

This simultaneous display of dispersion for alternative types of resources suggests both the complexity of conditions confronting individual States and the necessity of interpreting particular findings within a general context. States with large teacher dispersion but comparatively small expenditure dispersions are in many cases those with areas of low population density (for example, North Dakota, Colorado, Nebraska, Arizona) where to offer complete educational programs may require proportionately more staff. In the complementary case, large expenditure dispersions in States with small teacher dispersions may signal the presence of States that contain some areas with higher expenditure than others (perhaps because of metropolitan centers). Pennsylvania, Ohio, Tennessee, and Massachusetts offer examples of this phenomenon. This chart suggests the extent of interaction that may characterize findings presented thus far.

An inspection of changes in resource distribution over time is informative because it examines States against the possible standard of showing progress towards equalization. States' dispersions of educational resources across systems for the year 1976-77 are compared with those for 1969-70, seven years earlier. For many States, this was a period of active attention to school finance issues and reform in State funding plans. If States made improvements during this period, Theil coefficients showing dispersions should have declined from 1969-70 to 1976-77. State dispersion measures for core expenditure for the two years are displayed in Chart 3.7, which permits them to be examined in relation both to the national average and over time. A diagonal band centered on the figure for United States average within State dispersion is used to partition States into three groups: those with no appreciable change in dispersion, those with increases of more than .0075 in dispersion as measured by Theil coefficients, and those with decreases of more than .0075 in dispersion.

Chart 3.7
Theil Coefficients for Core Current Expenditure, by State: 1969-70 and 1976-77



Source: Table 3.18

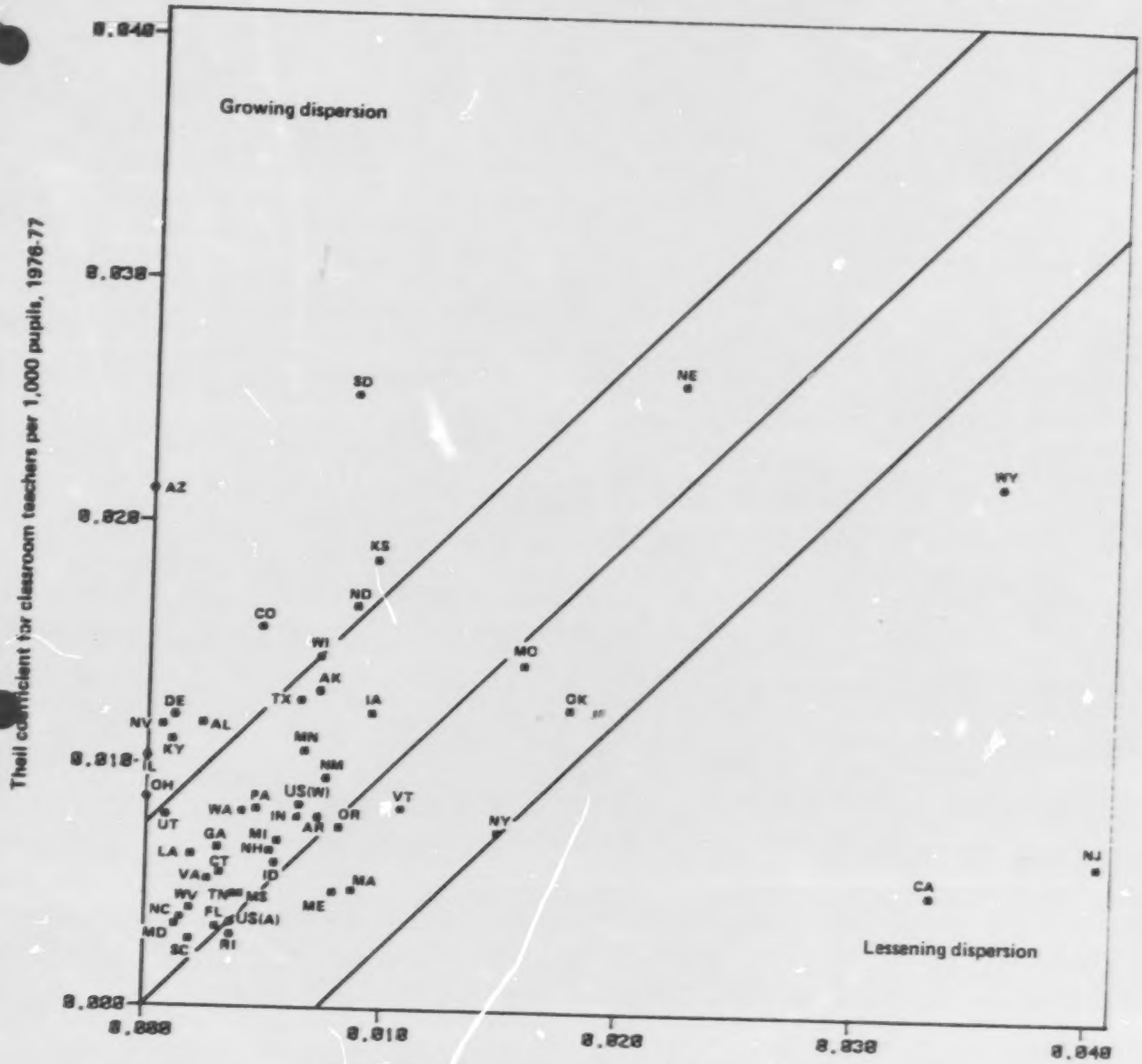
Seven States exhibited decreased expenditure dispersion over the period: California, Connecticut, Iowa, Maine, Oklahoma, Rhode Island and Vermont. In contrast, six States had increased dispersions: Alaska, Delaware, Massachusetts, Minnesota, New York, and Tennessee.

The most notable changes in classroom teacher dispersions over time in many cases occured in States different from those with major changes in expenditure dispersions. Chart 3.8 shows the changes in State coefficients for teacher-pupil dispersion. In this case, nineteen States had dispersions for both years that were less than average for the United States; in other words, they had systems in 1969-70 that were more equalized than the national average, and they remained more equalized in 1976-77. Twelve States had growing staffing dispersion over the period, while three States--California, New Jersey and Wyoming--reduced the dispersion of their staffing distributions.

Factors Contributing to Resource Variations

Variations in the levels of educational resources supplied to students may be attributable to differences in student needs, input prices or program costs. Earlier comparisons of expenditure and teacher variations suggested that some uncontrollable costs differences may result from sparsity of population. Other demographic features that have been cited as possible explanatory factors include school system size, metropolitan status, and cost of living differentials. Educational needs of particular student groups introduce additional, justifiable reasons for resource variations. This analysis reviewed the possible influence of contributing factors wherever data permitted such explorations.

Chart 3.8
Theil Coefficients for Classroom Teachers, by State: 1969-70 and 1976-77



Source: Table 3.19

The school system data base permitted inspection of enrollment and metropolitan status differences plus an examination of the relationship between expenditures and children in selected special needs categories. The State data base was used to consider the effects of the presence of different numbers of special needs pupils within the States and to test the effects on dispersion of applying a State-level cost of living adjustment.

School system size

School system size has been cited as a factor that could affect both per pupil costs of instruction and also the statistical analysis because of the considerable variation in the sizes of groups being studied. It was noted in Chapter 2 that the distribution of school systems departed substantially from the distribution of enrollments. The distributions of numbers of school systems by enrollment size and of enrollments by school system size for each State are provided in tables 3.21 and 3.22. The considerable differences in size distributions across States which are evident from an examination of these tables contribute to this interest.

The Theil coefficient was used to examine the effects of school system size (or of other special factors) on the analysis, by application of the decomposition capability. Average core expenditure per pupil for unified systems by enrollment size is shown by State in table 3.23, which decomposes the total variation of the distribution weighted by enrollment that is measured by the Theil coefficient. The table provides a percentage decomposition of the Theil coefficient into variation among the intervals and variation within the intervals. In most States, variation within the several enrollment groups explains a larger portion of the dispersion than variation among. Using enrollment to decompose disparity does not explain the differences noted among systems. However, in five States--Alaska, Illinois, Kentucky, Nevada, and

TABLE 3.21

NUMBER AND PERCENT OF SCHOOL SYSTEMS, BY ENROLLMENT SIZE, BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	TOTAL	25000 OR MORE		10000-24999		5000-9999	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
UNITED STATES....	10990	183	1.68	589	6.67	1013	9.29
ALABAMA.....	123	5	4.07	6	4.88	39	31.98
ALASKA.....	29	1	3.45	2	6.90	1	3.45
ARIZONA.....	71	3	4.23	2	2.82	5	7.04
ARKANSAS.....	369	1	0.27	3	0.81	10	2.71
CALIFORNIA.....	255	32	8.63	57	22.35	46	18.04
COLORADO.....	177	3	1.69	11	6.21	5	2.82
CONNECTICUT	109	1	0.92	15	13.76	23	21.10
DELAWARE.....	22	0	0.00	2	9.09	5	22.73
DIST OF COLUMBIA	1	1	100.00	0	0.00	0	0.00
FLORIDA.....	67	14	20.90	14	20.90	12	17.91
GEORGIA.....	194	10	5.43	7	3.80	28	15.22
HAWAII.....	1	1	100.00	0	0.00	0	0.00
IDAHO.....	105	0	0.00	2	1.90	7	6.67
ILLINOIS.....	461	3	0.68	15	3.40	20	4.54
INDIANA.....	295	5	1.69	18	6.10	25	8.47
IOWA.....	449	1	0.22	6	1.34	12	2.67
KANSAS.....	307	3	0.98	1	0.33	7	2.28
KENTUCKY.....	176	2	1.14	4	2.27	21	11.93
LOUISIANA.....	66	7	10.61	13	19.70	24	36.36
MAINE.....	115	0	0.00	1	0.87	4	3.48
MARYLAND.....	24	6	25.00	9	37.50	5	20.83
MASSACHUSETTS...	184	3	1.63	14	7.61	48	34.09
MICHIGAN.....	526	7	1.33	26	4.94	61	11.60
MINNESOTA.....	436	3	0.69	12	2.75	32	5.09
MISSISSIPPI.....	150	1	0.67	3	2.00	16	10.67
MISSOURI.....	453	2	0.44	14	3.09	18	3.97
MONTANA.....	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA.....	394	2	0.68	1	0.34	6	2.04
NEVADA.....	16	2	12.50	0	0.00	1	6.25
NEW HAMPSHIRE...	67	0	0.00	2	2.99	4	5.97
NEW JERSEY.....	203	3	1.48	1	7.88	52	25.62
NEW MEXICO.....	87	1	1.15	3	3.45	9	10.34
NEW YORK.....	660	5	0.76	31	4.70	81	12.27
NORTH CAROLINA..	145	7	4.83	24	16.55	50	34.48
NORTH DAKOTA....	252	0	0.00	2	0.79	2	0.79
OHIO.....	612	6	0.98	18	2.94	67	10.95
OKLAHOMA.....	454	2	0.44	4	0.88	8	1.76
OREGON.....	154	1	0.65	5	3.25	13	8.44
PENNSYLVANIA....	502	2	0.40	23	4.58	69	13.55
RHODE ISLAND....	29	0	0.00	4	13.79	6	20.69
SOUTH CAROLINA..	92	3	3.26	13	14.13	21	22.83
SOUTH DAKOTA....	182	0	0.00	2	1.10	2	1.10
TENNESSEE.....	127	5	3.94	8	6.30	34	26.77
TEXAS.....	967	18	1.86	38	3.93	60	6.14
UTAH.....	40	4	10.00	4	10.00	5	12.50
VERMONT.....	36	0	0.00	0	0.00	1	2.78
VIRGINIA.....	132	10	7.58	16	17.12	30	22.73
WASHINGTON.....	347	1	1.91	15	6.07	26	10.53
WEST VIRGINIA...	55	1	1.82	11	20.00	19	34.55
WISCONSIN.....	369	3	0.81	10	2.71	14	3.79
WYOMING.....	63	0	0.00	2	4.65	0	0.00
PUERTO RICO.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

TABLE 3.21, CONTINUED

NUMBER AND PERCENT OF SCHOOL SYSTEMS, BY ENROLLMENT SIZE, BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

2500-4999		1000-2499		600-999		300-599		1-299	
NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1916	17.58	1938	26.94	1476	13.54	1647	15.11	1220	11.19
30	48.65	31	75.20	2	1.63	0	0.00	0	0.00
3	10.34	2	6.90	3	10.34	4	13.79	13	44.83
16	22.54	19	26.76	13	18.31	6	8.45	7	9.86
23	6.23	73	19.78	75	20.33	114	30.89	70	18.97
60	15.69	66	18.06	19	7.45	13	5.10	12	4.71
15	8.47	37	20.90	15	8.47	32	18.08	59	33.33
36	33.03	33	30.28	1	0.92	0	0.00	0	0.00
12	54.55	3	13.64	0	0.00	0	0.00	0	0.00
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
15	22.39	10	14.93	2	2.99	0	0.00	0	0.00
59	32.07	70	38.04	7	3.80	3	1.63	1	0.54
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13	12.38	29	27.81	23	21.90	14	13.34	19	18.10
36	9.14	134	30.38	113	25.62	112	25.40	4	1.81
78	76.44	139	47.12	19	6.44	10	3.39	1	0.34
19	6.01	93	29.71	126	28.06	104	32.57	47	10.47
19	6.19	87	29.20	78	25.41	86	28.01	51	16.61
81	34.68	83	35.90	15	6.42	13	5.58	0	0.00
17	25.76	5	7.58	5	0.00	0	0.00	0	0.00
20	17.39	60	52.17	14	12.17	9	7.83	7	6.09
6	16.67	0	0.00	0	0.00	0	0.00	0	0.00
72	39.13	39	21.20	8	4.35	0	0.00	0	0.00
120	22.01	198	37.64	69	13.12	31	5.89	14	2.66
35	8.03	104	23.85	90	20.64	121	27.75	49	11.24
57	38.00	63	42.00	9	6.00	1	0.67	0	0.00
38	8.39	112	24.72	97	21.41	109	24.06	63	13.91
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
8	2.72	27	9.18	31	10.54	87	29.59	132	44.90
3	18.75	4	31.25	1	18.75	0	0.00	2	12.50
10	14.93	24	37.31	14	20.90	9	13.43	3	4.48
70	36.48	59	29.06	3	1.48	0	0.00	0	0.00
12	13.79	16	18.39	13	14.94	13	14.94	20	22.99
157	23.79	234	35.76	78	11.92	58	8.79	14	2.12
40	27.59	22	15.17	2	1.38	0	0.00	0	0.00
6	2.38	7	2.78	20	7.94	64	25.79	150	59.52
175	28.59	264	43.48	64	10.48	14	2.29	2	0.33
23	5.37	74	16.36	72	15.86	148	32.60	123	27.09
24	15.58	36	23.38	23	14.94	19	12.34	33	21.43
198	39.44	192	38.25	16	3.19	3	0.60	0	0.00
15	51.72	3	10.34	0	0.00	0	0.00	1	3.45
23	25.00	29	31.52	1	1.09	2	2.17	0	0.00
7	3.85	17	9.34	26	14.29	74	40.66	54	29.67
43	27.85	29	19.69	4	3.15	8	6.30	0	0.00
98	10.13	204	21.30	155	16.03	201	20.99	209	21.61
8	20.00	8	20.00	5	12.50	4	10.00	2	5.00
6	11.11	7	19.44	7	19.44	13	36.11	4	11.11
33	25.00	36	27.27	3	2.27	4	3.03	0	0.00
29	11.74	53	21.46	39	15.79	38	15.38	44	17.81
12	21.82	12	21.82	0	0.00	0	0.00	0	0.00
53	14.36	141	38.21	89	24.12	54	15.18	3	0.81
8	18.60	13	30.23	10	23.26	7	16.28	3	6.98
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINTION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

TABLE 3.22

NUMBER AND PERCENT OF PUPILS ENROLLED, BY SCHOOL SYSTEM ENROLLMENT SIZE, BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	TOTAL ENROLLED	25000 OR MORE		10000-24999		4000-9999	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
UNITED STATES....	40417741	12254750	30.33	7394722	18.27	7061444	17.47
ALABAMA.....	769133	234149	31.26	70689	9.44	208540	27.87
ALASKA.....	87864	40183	45.73	21562	24.54	9246	9.47
ARIZONA.....	274100	126803	42.46	26461	9.05	35378	12.89
ARKANSAS.....	458658	29039	6.33	47134	10.34	62845	13.46
CALIFORNIA.....	3935817	1500869	91.39	934413	28.53	341932	11.69
COLORADO.....	540206	197796	33.52	147517	33.47	38140	6.45
CONNECTICUT	573422	26877	4.75	200827	35.32	154835	27.00
DELAWARE.....	119884	0	0.00	38257	25.24	38571	32.18
DIST OF COLUMBIA	126587	126587	100.00	0	0.00	0	0.00
FLORIDA.....	1538271	1127153	73.37	241560	15.72	90104	5.87
GEORGIA.....	1090464	457937	41.99	93178	8.54	192402	17.64
HAWAII.....	173871	173871	100.00	0	0.00	0	0.00
IDAHO.....	199227	0	0.00	35360	17.75	49105	26.79
ILLINOIS.....	1402847	584933	41.70	209881	14.96	141431	10.08
INDIANA.....	1150362	217102	18.87	240598	20.91	170917	14.86
IOWA.....	603141	39842	6.61	104297	17.29	79846	13.07
KANSAS.....	456734	117855	25.80	19004	4.16	47176	10.33
KENTUCKY.....	692650	150771	21.77	47651	6.88	149812	21.63
LOUISIANA.....	836177	370701	44.34	216742	25.92	172439	20.67
MAINE.....	214753	0	0.00	11008	5.14	23679	11.03
MARYLAND.....	860879	651243	75.65	162038	18.83	30667	3.56
MASSACHUSETTS...	977846	137468	13.95	189677	19.40	329684	33.61
MICHIGAN.....	2072414	462997	21.38	375389	18.11	413554	19.94
MINNESOTA.....	890439	124436	14.36	176002	19.98	153693	17.43
MISSISSIPPI.....	499024	37827	9.59	13467	4.71	115464	23.14
MISSOURI.....	937281	174519	13.65	222973	28.93	130874	14.11
MONTANA.....	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA.....	279824	78794	28.58	10119	3.62	40149	14.35
NEVADA.....	141678	114749	81.00	0	0.00	5754	4.06
NEW HAMPSHIRE...	146391	0	0.00	10887	20.84	22073	15.28
NEW JERSEY.....	1056443	133910	12.68	236173	71.41	347640	32.91
NEW MEXICO.....	274408	81419	30.38	39208	14.28	64178	23.37
NEW YORK.....	3238180	1222033	37.74	405452	12.52	567511	17.53
NORTH CAROLINA..	1104006	109516	29.59	337954	29.47	324874	29.72
NORTH DAKOTA....	131144	0	0.00	20029	15.34	18015	13.74
OHIO.....	2290497	429903	18.96	252868	11.21	669934	29.88
OKLAHOMA.....	580907	109586	18.89	71769	12.38	58993	10.16
OREGON.....	602096	68166	14.96	68313	21.97	98496	21.54
PENNSYLVANIA....	2079211	309681	14.86	273173	13.14	457752	22.02
RHODE ISLAND....	163359	0	0.00	63108	38.63	42107	25.78
SOUTH CAROLINA..	617877	139447	21.63	182437	29.53	167187	27.06
SOUTH DAKOTA....	151135	0	0.00	29847	19.75	11642	7.72
TENNESSEE.....	956316	284387	33.21	178838	19.04	235029	27.45
TEXAS.....	2798491	1019232	36.46	581797	20.88	268877	9.61
UTAH.....	314471	160888	51.16	44901	20.44	37565	11.93
VERMONT.....	81693	0	0.00	0	0.00	9534	13.28
VIRGINIA.....	1087810	466026	42.45	235742	28.54	214733	19.74
WASHINGTON.....	769327	127119	14.56	231478	38.19	171252	22.29
WEST VIRGINIA...	401034	44817	11.11	159171	39.49	139627	33.92
WISCONSIN.....	983271	189181	18.28	134754	14.02	103836	11.47
WYOMING.....	96557	0	0.00	27277	31.51	0	0.00
PUERTO RICO.....	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM MERGED SCHOOL DISTRICT DATA FILE.

TABLE 3.22, CONTINUED

NUMBER AND PERCENT OF PUPILS ENROLLED, BY SCHOOL SYSTEM ENROLLMENT SIZE, BY STATE: 1976-77
1976-77.

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

2500-4999		1000-2499		600-999		300-599		1-299	
NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
4716941	16.42	4871623	12.05	1149957	2.87	736139	1.88	240369	0.99
176301	23.53	56550	7.55	1867	0.25	0	0.00	0	0.00
10313	11.74	3909	4.45	3414	3.77	1947	2.22	2272	2.49
52760	19.23	30270	11.04	10797	3.93	3521	0.92	1309	0.48
79055	17.24	116619	25.38	58536	12.76	48447	10.83	15855	3.46
144756	6.95	98286	3.76	14655	0.56	6097	0.21	2497	0.09
57763	10.31	55389	9.89	11503	2.05	13785	2.46	10317	1.84
131563	22.46	58429	10.19	918	0.16	0	0.00	0	0.00
44675	37.10	6570	9.49	0	0.00	0	0.00	0	0.00
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
57127	3.73	18496	1.20	1893	0.12	0	0.00	0	0.00
211969	19.48	127989	11.77	5819	0.53	1069	0.10	291	0.03
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
45986	23.08	40749	20.46	17379	8.72	6607	3.31	3830	1.92
120106	8.56	206767	14.60	88037	6.28	51694	3.69	1994	0.14
263703	22.93	237774	20.67	15958	1.39	6161	0.36	755	0.02
57939	9.61	148284	24.58	99006	16.42	64951	10.75	11393	1.99
66893	14.65	96394	21.11	58695	12.85	39807	8.72	10911	2.39
217466	31.39	109719	15.84	12599	1.82	4654	0.67	0	0.00
64106	7.69	10139	1.21	0	0.00	0	0.00	0	0.00
65268	30.66	97556	45.83	11421	5.33	4209	1.96	1112	0.52
17114	1.99	0	0.00	0	0.00	0	0.00	0	0.00
254087	25.98	66746	6.83	6189	0.63	0	0.00	0	0.00
423076	20.41	364719	18.63	55999	2.70	14097	0.68	2778	0.13
125948	14.30	163980	18.58	70578	8.01	52872	6.00	11767	1.33
701336	40.35	113220	22.69	7382	1.48	332	0.07	0	0.00
131865	14.22	179489	19.36	75112	8.10	47750	5.15	13051	1.41
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
27199	9.72	38408	13.72	22468	8.03	35487	12.69	26268	9.38
9425	0.65	9887	6.35	2386	1.68	0	0.00	359	0.25
14295	33.75	41574	38.79	11626	9.05	4881	3.77	725	0.50
235191	33.26	110789	18.49	3719	0.76	0	0.00	0	0.00
42183	19.38	28068	9.47	10099	3.48	5969	2.16	3851	1.33
561294	17.33	389194	12.02	62879	1.93	26434	0.83	3172	0.10
152428	12.77	19734	1.33	1498	0.13	0	0.00	0	0.00
17716	13.51	9139	6.97	14594	11.13	27819	21.06	23943	18.26
993489	26.37	445987	19.80	93149	2.36	6471	0.30	93	0.00
84351	14.93	108440	18.68	55402	9.56	46171	11.05	27720	6.79
77959	19.19	58068	14.44	17193	4.28	8204	2.04	5569	1.39
890965	17.94	339962	16.35	12827	0.62	1471	0.07	0	0.00
52101	31.89	5951	3.64	0	0.00	0	0.00	100	0.06
83446	13.51	49206	7.96	825	0.13	1124	0.18	0	0.00
23017	15.24	24610	16.29	20206	13.37	31753	20.65	10970	6.99
157357	18.38	43374	5.07	3440	0.40	1927	0.45	0	0.00
348906	12.48	329579	11.75	170697	6.32	87944	3.15	37728	1.35
10888	9.82	13648	6.34	6263	1.35	1719	0.55	498	0.16
11639	27.92	12185	29.23	5193	12.38	6124	14.70	1046	7.51
120406	10.99	64687	5.87	2485	0.23	1951	0.17	0	0.00
96756	12.59	85159	11.08	31009	4.04	17455	2.27	8106	1.06
18940	9.71	27680	5.66	0	0.00	0	0.00	0	0.00
184184	20.41	218317	24.16	70987	7.85	25705	2.85	949	0.26
27549	31.93	20513	23.78	7437	8.62	3237	3.75	564	0.65
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION.
FROM MERGED SC - 5 DISTRICT FILE.

TABLE 1.23

CORE CURRENT EDUCATION EXPENDITURES PER PUPIL BY ENROLLMENT GROUP SIZE AND BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	ENROLLMENT GROUP SIZE							THEIL COEFFICIENT		
	TOTAL	25,000 AND OVER	10,000-24,999	5,000-9,999	2,500-4,999	1,000-2,499	LESS THAN 1,000	TOTAL	PERCENT VARIATIONS AMONG GROUPS	PERCENT VARIATIONS WITHIN GROUPS
ALABAMA	875?	8819	8730	8710	8742	8764	8733	7.3	24.7	75.3
ALASKA	7496	3106	3103	2375	3122	3840	3178	20.3	65.4	34.6
ARIZONA	1216	1227	1097	1139	1216	1269	1372	9.0	14.4	85.6
ARKANSAS	812	967	997	946	788	761	777	15.8	22.8	77.2
CALIFORNIA	1932	1978	1674	1629	1621	1681	1781	9.4	9.6	90.4
COLORADO	1439	1572	1389	1341	1317	1300	1512	14.7	18.4	81.6
CONNECTICUT	1606	1859	1509	1459	1358	1331	1476	18.9	17.8	81.7
DELAWARE	1781	0	1875	1719	1300	1184	0	33.8	18.2	82.2
DIST OF COLUMBIA	1914	1914	0	0	0	0	0	0.0	0.0	0.0
FLORIDA	1256	1282	1180	1206	1158	1211	1384	7.1	8.5	91.5
GEORGIA	952	1087	953	849	843	823	877	18.3	39.9	60.1
HAWAII	1559	1559	0	0	0	0	0	0.0	0.0	0.0
IDAHO	962	0	997	958	938	987	1107	10.3	25.9	83.1
ILLINOIS	1384	1369	1356	1219	1171	1104	1219	15.4	40.4	39.6
INDIANA	1049	1227	1128	1041	963	933	994	12.2	66.7	93.3
IOWA	1377	1438	1394	1408	1366	1317	1389	2.6	15.4	84.6
KANSAS	1229	1274	1127	1193	1147	1140	1309	10.0	19.0	97.0
KENTUCKY	849	1141	715	765	788	790	817	20.8	73.5	26.5
LOUISIANA	946	1054	940	953	928	1121	0	7.2	37.5	62.5
MAINE	1036	0	1336	1039	1056	1031	1054	10.9	20.2	79.8
MARYLAND	1540	1609	1331	1387	1386	0	0	10.5	27.6	72.4
MASSACHUSETTS	1656	2284	1619	1599	1489	1425	1633	28.4	39.4	60.6
MICHIGAN	1392	1471	1564	1362	1262	1134	1139	19.5	32.8	67.2
MINNESOTA	1713	1689	1350	1351	1294	1240	1301	10.3	30.7	69.3
MISSISSIPPI	811	1109	734	818	781	803	934	10.2	38.2	61.8
MISSOURI	1100	1481	1110	1081	1094	960	949	25.2	38.9	61.1
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1356	1358	1157	1257	1238	1267	1513	14.8	24.3	75.7
NEVADA	1316	1194	0	1139	1299	1339	1566	2.4	38.3	61.7
NEW HAMPSHIRE	1049	0	1081	1184	958	1049	988	9.0	25.0	75.0
NEW JERSEY	1609	1813	1556	1523	1609	1670	1684	11.3	1.8	98.2
NEW MEXICO	1186	1128	1166	1139	1234	1211	1913	7.9	40.5	59.5
NEW YORK	2216	2423	2069	2222	2127	1868	1907	19.3	20.2	79.8
NORTH CAROLINA	1083	1078	967	991	984	1080	1237	7.2	19.1	80.8
NORTH DAKOTA	1267	0	1281	1381	1186	1193	1197	12.3	4.1	95.1
OHIO	1199	1473	1347	1201	1089	1014	1084	25.4	36.2	63.8
OKLAHOMA	936	1087	884	877	879	899	1054	12.9	10.3	89.7
OREGON	1355	1734	1378	1317	1440	1497	1599	6.5	30.8	69.2
PENNSYLVANIA	1378	1802	1415	1382	1255	1197	1263	21.3	63.7	35.9
RHODE ISLAND	1444	0	1592	1366	1377	1451	2472	9.3	19.8	99.1
SOUTH CAROLINA	845	946	830	909	923	792	842	9.5	21.1	78.9
SOUTH DAKOTA	1058	0	1055	812	949	1108	1127	18.2	25.3	74.1
TENNESSEE	881	1090	925	748	750	783	710	25.4	39.6	60.4
TEXAS	1046	1049	1008	1061	1048	1044	1125	15.1	3.3	97.4
UTAH	1052	1058	1057	1029	1080	1119	1399	6.4	29.5	70.5
VERMONT	1316	0	0	1481	1481	1251	1194	14.9	30.7	69.3
VIRGINIA	1122	1241	1132	967	972	1030	1065	27.3	20.1	79.9
WASHINGTON	1361	1670	1369	1278	1237	1284	1341	16.3	31.5	68.5
WEST VIRGINIA	1014	1171	1005	1043	935	1083	0	4.7	34.0	66.0
WISCONSIN	1448	1738	1448	1471	1186	1317	1378	10.2	46.1	53.9
WYOMING	1426	0	1257	0	1488	1455	1819	10.7	37.4	63.6
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS.
SPECIAL TABULATIONS FROM MERGED SCHOOL DISTRICT FILE.

Tennessee—the variation among the intervals is greater than that within. In other words, for only these five States does enrollment size statistically account for a majority of the observed dispersion.

Metropolitan Status

A related but distinct factor from that of school system size is the metropolitan status of the school system. A metropolitan status code 2/ was established for each unified system. Theil coefficients for each State were again decomposed, in this case for the variation within and among the three designated categories. The average expenditure by category, the value of the Theil coefficient, and the percent of the total variation explained by among and within group intervals is shown in table 3.24. The results show that only in the case of three States—Delaware, Kentucky, and Tennessee—is more of the variation explainable as being among groups than within. Thus only in those three States would a metropolitan classification have great explanatory value in explaining expenditure disparity. The substantial proportion of the among group variation for these three States is particularly surprising in view of the fact that the classification makes so little difference for most of the other States. In two States, Illinois and Georgia, the variation explained within groups is about equal to that explained by the group classification.

Special Needs Populations

In recent years, both State and Federal governments have grown more concerned about the special educational needs of particular pupils. These students include children from households with low income or in poverty, the educationally disadvantaged, racial and linguistic minorities, and children with physical or emotional handicaps. At the school system level, data were available on the numbers of children classified as being in poverty, of a minority status, or of Hispanic origin. To inspect for possible systematic

TABLE 1.24

CURRENT EDUCATION EXPENDITURE PER PUPIL BY METROPOLITAN STATUS OF SCHOOL SYSTEM, BY STATE: 1976-77

(INCLUDES EXPENDITURES ONLY FOR PUPILS IN SCHOOL DISTRICTS WITH GRADES 1-12)

STATE OR OTHER AREA	AVERAGE (MEAN) EXPENDITURE PER PUPIL BY METROPOLITAN STATUS				THEIL CODE VARIANT		
	ALL SCHOOL SYSTEMS	CENTRAL CITY SYSTEMS IN SMSA'S	SYSTEMS IN SMSA'S OUTSIDE CENTRAL CITIES	SYSTEMS OUTSIDE SMSA'S	VALUE OF COEFFICIENT	PERCENT OF WITHIN INTERVALS	PERCENT OF AMONG INTERVALS
ALABAMA	$ 757	$ 826	$ 750	$ 723	7.2	77.6	22.4
ALASKA	2486	0	0	2486	96.3	108.3	3.3
ARIZONA	1216	1216	1195	1219	6.5	98.9	1.1
ARKANSAS	912	976	782	787	15.9	80.5	19.5
CALIFORNIA	1583	1583	1438	1368	9.6	91.3	8.7
COLORADO	1419	1612	1405	1364	16.7	84.9	15.9
CONNECTICUT	1660	1519	1448	1791	16.9	97.1	7.9
DELAWARE	1381	2098	1385	1096	23.8	17.3	82.7
DIST OF COLUMBIA	1910	1914	0	0	0.0	0.0	0.0
FLORIDA	1258	1388	1241	1171	7.1	85.9	14.6
GEORGIA	982	1187	988	969	18.3	98.1	68.9
HAWAII	1568	1569	0	0	0.0	0.0	0.0
IDAHO	963	1076	776	976	18.3	80.7	19.3
ILLINOIS	1364	1533	1273	1153	15.4	56.9	69.1
INDIANA	1049	1197	967	981	12.2	80.2	19.8
IOWA	1377	1412	1351	1379	2.6	98.7	6.3
KANSAS	1229	1387	1189	1237	10.0	95.6	6.6
KENTUCKY	849	1139	813	745	20.8	73.4	78.6
LOUISIANA	966	1031	876	914	7.2	73.8	79.2
MAINE	1036	1091	1189	1011	10.9	88.3	11.5
MARYLAND	1540	1468	1823	1347	10.5	79.2	78.8
MASSACHUSETTS	1656	1913	1697	1371	29.4	81.7	19.3
MICHIGAN	1392	1525	1394	1191	19.9	75.3	76.7
MINNESOTA	1763	1783	1374	1765	10.3	91.3	88.7
MISSISSIPPI	811	1931	762	796	10.2	97.3	82.7
MISSOURI	1108	1279	1143	968	25.2	78.6	28.7
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1356	1373	1148	1387	14.8	87.1	12.9
NEVADA	1218	1193	1195	1365	2.4	74.3	28.7
NEW HAMPSHIRE	1049	1081	968	1091	9.6	95.7	6.3
NEW JERSEY	1609	1549	1640	1589	11.3	97.5	2.5
NEW MEXICO	1186	1129	0	1212	7.9	93.3	6.7
NEW YORK	2210	2609	2198	1917	19.3	76.5	73.5
NORTH CAROLINA	1093	1128	971	963	7.2	66.1	76.9
NORTH DAKOTA	1267	1423	1197	1192	12.3	90.3	9.7
OHIO	1198	1047	1178	988	25.4	61.9	38.6
OKLAHOMA	938	961	875	949	12.9	85.1	6.9
OREGON	1587	1716	1519	1482	6.6	77.9	29.3
PENNSYLVANIA	1376	1681	1348	1161	21.3	60.1	39.9
RHODE ISLAND	1444	1602	1339	1454	9.3	98.6	61.6
SOUTH CAROLINA	949	1092	936	919	9.8	78.6	23.4
SOUTH DAKOTA	1058	1787	960	1048	16.3	98.9	1.1
TENNESSEE	881	1129	876	760	25.9	31.8	68.2
TEXAS	1065	1064	986	1083	15.1	95.9	6.5
UTAH	1052	1191	1009	1100	6.6	87.7	12.3
VERMONT	1319	0	0	1319	14.5	100.0	1.0
VIRGINIA	1127	1169	1760	991	27.3	68.7	31.3
WASHINGTON	1363	1956	1307	1287	19.5	77.7	29.3
WEST VIRGINIA	1019	1162	1129	968	4.7	93.8	16.3
WISCONSIN	1469	1951	1454	1317	10.2	95.3	16.7
WYOMING	1425	0	0	1425	10.7	100.0	1.0
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS.
SPECIAL TABULATIONS FROM FISCAL SCHOOL DISTRICT FILE.

biases in resource distribution affecting these groups, expenditure figures (both core and total) were correlated with percentages of school system enrollments in the three categories. The coefficients for the States are shown in table 3.25. The generally small coefficients may reflect genuine limits in the relationships between expenditure and special groups, problems of data quality, or both. While the small coefficients argue against systematic bias, the presence of some negative signs may suggest that systems with concentrations of these special needs populations tended to receive fewer resources.

While expenditure variations within States do not show biases either favoring or discriminating against special groups, many educators believe that several characteristics qualify pupils for additional resources in order to assure equal education. The existence of special services for handicapped or limited English speaking children reflects this view. The analysis has not thus far addressed either the presence of these special populations nor their possible impact on observed variations in resource distribution. Data on children in special classifications were available at the State level from the Survey of Income and Education. Unduplicated counts of children in special categories, numbers of multiple-classification children, and children in each of six other classifications were assembled by State, as shown in table 3.26. The range in the State proportions of children in these classifications is shown in Chart 3.9. The chart reveals the considerable variation in the incidence of these groups across States. It can easily be seen, for example, that handicapped students are a reasonably small proportion of the student population in all States, but also that there is little variation among States in the proportion of students in this special needs group. In fact, for 39 States the proportions of pupils who are handicapped is within 1 percent of the United States average of 6.5 percent. In contrast, the proportions of students who are from minority groups range greatly, from 1 percent to 89 percent. Many of the

TABLE 3.25

CORRELATION OF SCHOOL SYSTEM TOTAL AND CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, 1976-77 WITH PERCENT OF CHILDREN 5 TO 17 YEARS OLD IN SELECTED SPECIAL CLASSIFICATIONS, BY STATE.

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	CORRELATION OF: CORE CURRENT EDUCATION EXPENDITURE PER PUPIL		TOTAL EDUCATION EXPENDITURE PER PUPIL			
	PERCENT OF CHILDREN IN POVERTY, 1969	PERCENT OF CHILDREN MINORITY, 1976	PERCENT OF CHILDREN HISPANIC, 1976	PERCENT OF CHILDREN IN POVERTY, 1969	PERCENT OF CHILDREN MINORITY, 1976	PERCENT OF CHILDREN HISPANIC, 1976
ALABAMA	-0.12	0.20	0.24	0.14	0.24	0.16
ALASKA	0.21	0.66	-0.03	-0.15	0.12	0.15
ARIZONA	0.18	0.44	-0.15	0.16	0.29	-0.06
ARKANSAS	0.18	0.07	0.13	0.12	0.05	0.17
CALIFORNIA	0.36	0.12	-0.15	0.07	0.12	-0.21
COLORADO	-0.14	0.08	-0.12	-0.19	-0.14	-0.19
CONNECTICUT	-0.26	0.25	0.11	-0.01	0.26	0.17
DELAWARE	-0.13	0.16	0.48	-0.01	0.18	0.07
DIST OF COLUMBIA	0.00	0.00	0.00	0.00	0.00	0.00
FLORIDA	-0.18	-0.01	0.20	0.04	0.01	0.27
GEORGIA	-0.17	0.19	0.33	0.10	0.08	0.14
HAWAII	0.00	0.00	0.00	0.00	0.00	0.00
IDAHO	-0.15	0.07	-0.07	0.08	-0.05	-0.19
ILLINOIS	0.17	0.31	0.07	0.11	0.21	0.02
INDIANA	-0.01	0.48	0.00	0.04	0.24	0.21
IOWA	0.34	0.11	0.00	-0.02	-0.01	0.00
KANSAS	0.12	0.03	0.08	0.17	0.01	0.08
KENTUCKY	-0.13	0.10	-0.01	-0.14	0.18	-0.18
LOUISIANA	0.09	0.26	0.01	0.08	0.13	0.04
MAINE	-0.22	-0.06	-0.01	0.13	0.00	-0.07
MARYLAND	-0.35	0.22	0.20	0.04	0.41	0.18
MASSACHUSETTS	0.01	0.42	0.14	0.15	0.46	0.15
MICHIGAN	-0.19	0.36	0.08	-0.12	0.20	0.01
MINNESOTA	0.01	0.22	0.13	0.00	0.08	0.01
MISSISSIPPI	0.21	0.33	0.16	0.23	0.27	0.16
MISSOURI	-0.06	0.25	0.11	-0.07	0.16	0.07
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	0.10	0.10	-0.01	0.16	0.02	-0.08
NEVADA	0.10	-0.14	-0.16	-0.16	-0.04	-0.01
NEW HAMPSHIRE	-0.07	0.20	0.16	-0.13	0.41	0.26
NEW JERSEY	-0.18	0.30	-0.15	-0.08	0.18	0.10
NEW MEXICO	0.12	0.29	0.14	0.20	0.13	0.02
NEW YORK	-0.10	0.25	0.19	-0.25	0.24	0.18
NORTH CAROLINA	0.16	0.42	0.06	0.18	0.30	0.19
NORTH DAKOTA	-0.16	0.10	0.09	-0.07	0.02	-0.09
OHIO	-0.29	0.27	-0.01	-0.16	0.18	-0.02
OKLAHOMA	-0.02	0.07	0.17	-0.06	0.02	0.11
OREGON	0.12	-0.17	-0.28	0.05	0.09	0.14
PENNSYLVANIA	-0.23	0.18	0.18	-0.05	0.25	0.07
RHODE ISLAND	0.29	0.09	0.01	0.26	0.10	0.01
SOUTH CAROLINA	-0.23	-0.14	0.11	-0.22	-0.22	0.15
SOUTH DAKOTA	0.29	0.29	-0.01	0.19	0.07	-0.05
TENNESSEE	-0.27	0.14	0.26	-0.11	0.06	0.14
TEXAS	0.10	0.19	0.30	0.00	0.05	0.19
UTAH	0.05	-0.09	-0.17	-0.07	0.06	-0.26
VERMONT	-0.18	0.19	0.10	-0.20	0.26	0.15
VIRGINIA	-0.10	0.11	0.06	-0.17	0.16	0.04
WASHINGTON	-0.02	0.09	0.01	0.03	0.06	0.01
WEST VIRGINIA	-0.26	0.07	-0.01	-0.02	0.06	-0.20
WISCONSIN	-0.01	0.00	0.01	0.14	0.05	-0.01
WYOMING	0.18	-0.26	-0.27	0.20	-0.08	-0.14
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED SCHOOL DISTRICT FILE.

STATE OR OTHER AREA	TOTAL CHILDREN 5 TO 17	TOTAL CHILDREN CLASSIFIED AS SPECIAL (HANDICAPPED) CHILDREN		MULTIPLE CATEGORY CHILDREN		CHILDREN IN FACILITIES BELOW THE PRIMARY LEVEL		CHILDREN IN FACILITIES RESTRICTED PUBLIC ASSISTANCE	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
UNITED STATES	49722301	1971000	96.0	823000	18.5	776000	14.0	560,000	11.3
ALABAMA	868705	771931	83.0	109000	18.2	109000	17.1	73000	9.4
ALASKA	87017	10020	85.0	11000	13.5	7000	8.0	7000	7.0
ARIZONA	963401	749987	85.1	104000	20.0	97000	17.7	67000	8.6
ARKANSAS	500493	399497	81.1	73000	14.7	109000	21.0	63000	8.6
CALIFORNIA	6758697	2312000	66.1	1000000	33.1	713000	14.0	660000	13.7
COLORADO	858977	700000	83.1	110000	18.1	67000	11.1	50000	8.0
CONNECTICUT	704000	1700000	85.0	90000	11.0	60000	8.0	60000	6.0
DELAWARE	130000	80000	88.1	10000	13.0	10000	11.0	10000	8.0
DIST OF COLUMBIA	109000	1000000	89.0	90000	30.0	30000	10.0	30000	26.0
FLORIDA	1780000	1422000	80.0	450000	31.0	300000	17.0	180000	9.0
GEORGIA	1902000	1600000	84.0	300000	20.0	300000	17.0	300000	15.0
HAWAII	200000	160000	80.0	40000	25.0	30000	15.0	20000	10.0
IDAHO	207000	60000	29.0	10000	8.0	30000	15.0	20000	9.0
ILLINOIS	2000000	1000000	50.0	500000	50.0	400000	20.0	400000	20.0
INDIANA	1000000	800000	80.0	100000	8.0	150000	15.0	80000	8.0
IOWA	480000	380000	79.0	70000	9.0	60000	8.0	40000	7.0
KANSAS	450000	350000	78.0	40000	9.0	40000	9.0	30000	7.0
KENTUCKY	650000	500000	77.0	80000	16.0	100000	20.0	70000	14.0
LOUISIANA	870000	660000	67.0	200000	30.0	220000	20.0	110000	12.0
MAINE	200000	70000	70.0	20000	9.0	40000	20.0	30000	15.0
MARYLAND	980000	800000	80.0	100000	10.0	100000	10.0	100000	10.0
MASSACHUSETTS	1200000	1000000	84.0	100000	10.0	110000	9.0	100000	10.0
MICHIGAN	2000000	1600000	80.0	200000	12.0	200000	10.0	200000	10.0
MINNESOTA	900000	700000	77.0	90000	9.0	90000	9.0	70000	7.0
MISSISSIPPI	600000	500000	83.0	80000	10.0	100000	20.0	60000	10.0
MISSOURI	1000000	800000	80.0	100000	10.0	100000	10.0	100000	10.0
MONTANA	180000	140000	78.0	20000	9.0	30000	15.0	20000	9.0
NEBRASKA	300000	240000	80.0	30000	10.0	40000	10.0	30000	9.0
NEVADA	100000	80000	80.0	10000	10.0	10000	10.0	10000	10.0
NEW HAMPSHIRE	200000	160000	80.0	20000	10.0	30000	15.0	20000	10.0
NEW JERSEY	1600000	1300000	81.0	200000	12.0	200000	12.0	200000	12.0
NEW MEXICO	400000	300000	75.0	100000	25.0	100000	25.0	80000	20.0
NEW YORK	4000000	3200000	80.0	400000	10.0	400000	10.0	400000	10.0
NORTH CAROLINA	1200000	1000000	83.0	200000	17.0	200000	17.0	200000	17.0
NORTH DAKOTA	140000	100000	71.0	20000	14.0	20000	14.0	20000	14.0
OHIO	2000000	1600000	80.0	200000	12.0	200000	12.0	200000	12.0
OKLAHOMA	700000	600000	86.0	100000	17.0	100000	17.0	100000	17.0
OREGON	700000	600000	86.0	100000	17.0	100000	17.0	100000	17.0
PENNSYLVANIA	2000000	1600000	80.0	200000	12.0	200000	12.0	200000	12.0
RHODE ISLAND	200000	160000	80.0	20000	12.0	30000	15.0	20000	10.0
SOUTH CAROLINA	600000	500000	83.0	100000	17.0	100000	17.0	100000	17.0
SOUTH DAKOTA	160000	120000	75.0	20000	17.0	20000	17.0	20000	17.0
TENNESSEE	900000	700000	78.0	100000	14.0	100000	14.0	100000	14.0
TEXAS	3500000	2800000	80.0	400000	14.0	400000	14.0	400000	14.0
UTAH	320000	260000	81.0	40000	15.0	40000	15.0	30000	9.0
VERMONT	110000	80000	73.0	10000	13.0	10000	13.0	10000	9.0
VIRGINIA	1200000	1000000	83.0	200000	20.0	200000	20.0	200000	17.0
WASHINGTON	1000000	800000	80.0	100000	12.0	100000	12.0	100000	10.0
WEST VIRGINIA	400000	300000	75.0	40000	13.0	40000	13.0	40000	10.0
WISCONSIN	1000000	800000	80.0	100000	12.0	100000	12.0	100000	10.0
WYOMING	90000	70000	78.0	10000	14.0	10000	14.0	10000	11.0
OUTLYING AREAS	91000	71000	78.0	9000	13.0	9000	13.0	9000	10.0
PUERTO RICO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: SEE FOOTNOTE FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, NATIONAL CENTER FOR EDUCATIONAL STATISTICS, DIVISION OF INCOME AND EDUCATION, UNPUBLISHED TABULATIONS.

/SPECIAL CLASSIFICATIONS ARE NOT MUTUALLY EXCLUSIVE. FOR EXAMPLE, A CHILD COULD BE TO A PUBLIC WELFARE AND STUDENT LEVEL THAT IS RESTRICTING PUBLIC ASSISTANCE, CLASSIFIED AS HANDICAPPED, OF EDUCATIONAL HERITAGE, OF LIMITED ENGLISH SPEAKING ABILITY, AND DISADVANTAGED.

TOTAL U.S. POPULATION AND NUMBER AND PERCENT OF CHILDREN U.S. UNDER AGE, BY SPECIAL CLASSIFICATIONS, AS STATED: 1976

(EXCLUDES ALL CHILDREN)

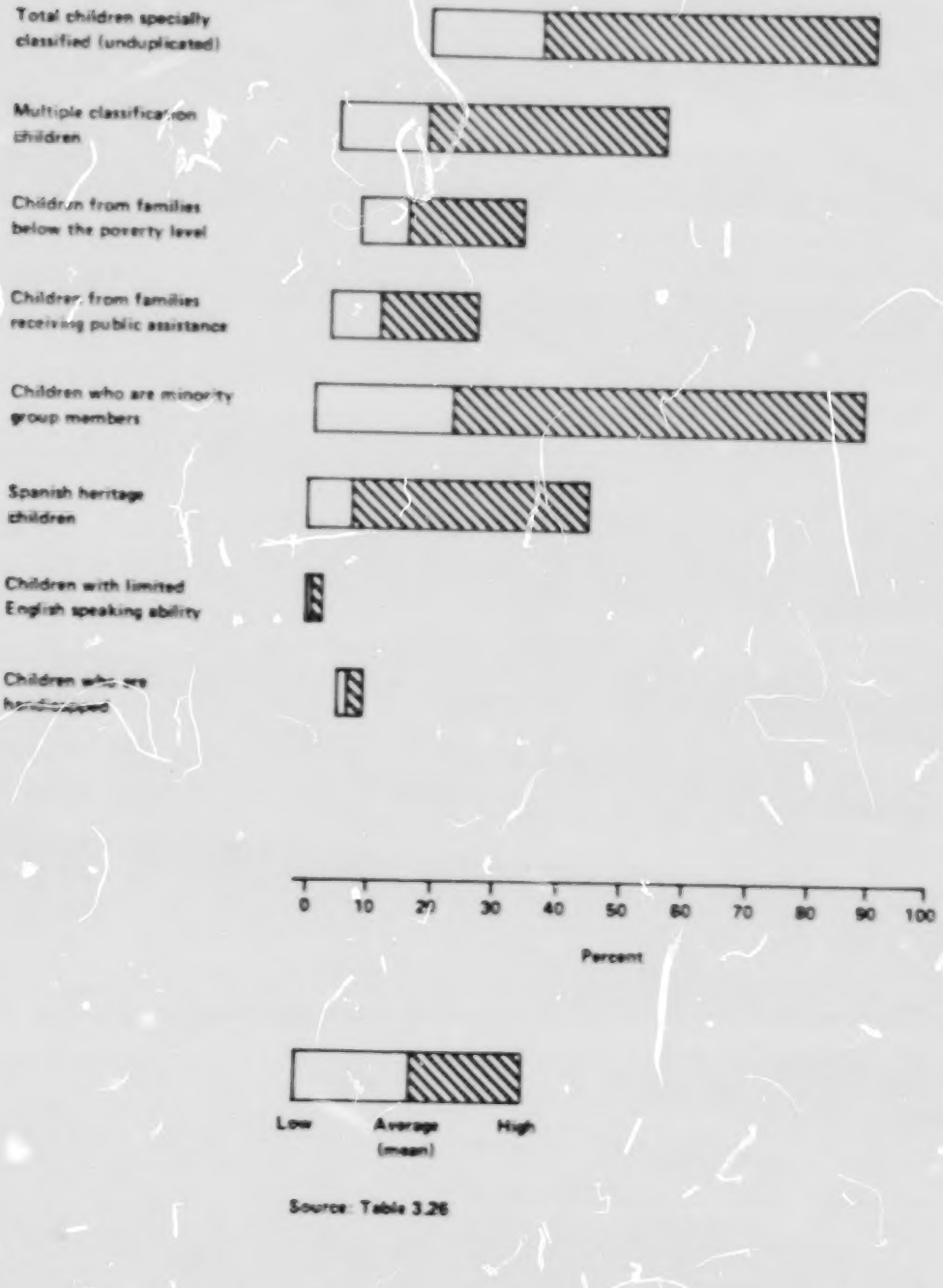
STATE OR OTHER AREA	NUMBER CHILDREN		SEPARATED OR DIVORCED CHILDREN		CHILDREN WITH LIMITED ENGLISH-SPEAKING ABILITY		HANDICAPPED CHILDREN	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
UNITED STATES	11507944	73.1	2631934	7.1	377748	0.6	1702106	6.9
ALABAMA	201835	12.4	2937	2.3	0	0.0	20736	6.1
ALASKA	27361	27.9	1471	1.7	256	0.3	2830	6.0
ARIZONA	193078	33.1	130574	21.9	5668	1.4	45788	7.7
ARKANSAS	114326	23.3	4390	1.1	0	0.0	15838	7.2
CALIFORNIA	1913199	78.7	1053044	22.1	99691	1.7	913149	6.6
COLORADO	171458	71.1	21787	15.2	867	0.1	17851	6.7
CONNECTICUT	87877	13.8	26587	7.9	7499	0.6	17488	6.7
DELAWARE	26076	18.9	2931	7.0	183	0.1	2180	6.0
DIST OF COLUMBIA	129096	98.9	1776	0.8	195	0.1	8858	6.6
FLORIDA	579817	53.5	176787	9.9	6779	0.4	113274	6.4
GEORGIA	872235	33.5	6786	0.3	0	0.0	101816	6.5
HAWAII	155369	75.6	8781	6.2	3907	1.1	11760	6.7
IDAHO	13695	4.8	9186	6.6	227	0.1	12194	6.6
ILLINOIS	878826	74.2	129187	9.9	6878	0.3	154966	6.7
INDIANA	140967	11.1	28871	2.4	1395	0.8	72151	6.7
IOWA	19380	2.8	9184	1.3	341	0.0	46184	6.8
KANSAS	64666	12.7	13196	2.6	0	0.0	32617	6.6
KENTUCKY	93697	11.8	0	0.0	877	0.1	62271	7.7
LOUISIANA	376853	38.5	23838	7.6	7234	0.7	61838	6.7
MAINE	1876	1.6	2877	0.8	288	0.1	13877	6.7
MARYLAND	281533	28.7	6818	3.8	1731	0.1	68838	6.8
MASSACHUSETTS	97251	7.3	35368	3.7	8843	0.8	107838	6.8
MICHIGAN	321147	18.7	38888	3.3	878	0.8	141747	6.8
MINNESOTA	36972	3.7	6833	0.7	0	0.0	41838	6.8
MISSISSIPPI	276781	46.8	1881	0.3	837	0.1	38877	6.8
MISSOURI	168898	14.8	6881	7.8	0	0.0	83881	6.8
MONTANA	11888	8.8	3227	1.8	183	0.1	12883	6.7
NEBRASKA	31862	8.8	11888	3.8	1248	0.3	22837	6.8
NEVADA	28362	18.8	11886	8.8	781	0.8	8877	6.7
NEW HAMPSHIRE	7775	1.1	883	0.8	48	0.0	13781	6.8
NEW JERSEY	368219	31.3	111827	8.7	14883	0.8	185887	6.8
NEW MEXICO	186728	48.8	137231	48.7	6272	2.8	17788	6.8
NEW YORK	1881337	37.1	447588	11.8	84871	1.8	388186	6.7
NORTH CAROLINA	382178	38.8	0	0.0	0	0.0	72241	6.7
NORTH DAKOTA	8881	6.3	428	7.4	88	0.7	8188	6.8
OHIO	323815	12.7	84427	3.8	6383	0.3	148812	6.8
OKLAHOMA	83872	18.7	12773	2.8	1365	0.2	68876	6.7
OREGON	37788	7.2	13866	3.7	2381	0.8	37888	7.8
PENNSYLVANIA	342187	12.8	92884	7.8	13784	0.8	158888	6.7
RHODE ISLAND	16873	6.8	7817	8.8	1788	0.8	13887	6.8
SOUTH CAROLINA	288228	41.7	0	0.0	0	0.0	53818	7.7
SOUTH DAKOTA	8853	8.8	878	8.8	178	0.1	11884	6.2
TENNESSEE	284878	31.7	7821	8.8	0	0.0	48728	6.8
TEXAS	1282828	63.8	838788	28.8	77883	2.8	188837	8.8
UTAH	18722	5.8	13888	4.2	873	0.2	18887	6.8
VERMONT	1822	8.8	881	8.8	8	0.0	8858	6.2
VIRGINIA	248423	27.1	17888	1.8	8838	0.8	72388	6.2
WASHINGTON	88178	8.8	28781	8.1	8288	0.8	87838	6.2
WEST VIRGINIA	13883	3.8	3888	8.8	8	0.0	28888	7.2
WISCONSIN	82868	8.8	18878	7.8	888	0.1	88178	6.8
WYOMING	8583	6.8	8488	8.8	88	0.8	8881	6.8
OTHER AREA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: SEE CLASSIFICATIONS FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, NATIONAL CENTER FOR EDUCATION STATISTICS, SURVEY OF FACTORS AND EDUCATION, UNPUBLISHED TABULATIONS.

/SPECIAL CLASSIFICATIONS ARE NOT MUTUALLY EXCLUSIVE. FOR EXAMPLE, A CHILD COULD BE IN A FAMILY BELOW THE POVERTY LEVEL THAT IS RECEIVING PUBLIC ASSISTANCE, CLASSIFIED AS POVERTY, OF SPANISH HERITAGE, OF LIMITED ENGLISH SPEAKING ABILITY, AND HANDICAPPED.

Chart 3.9
Range in State Percent of Children 5-17 Years Old with Special Needs, United States: 1976



Source: Table 3.26

populations of students with special needs are concentrated by regions. Because regions serving concentrations of particular student groups vary, the phenomenon of special populations is geographically dispersed. The highest concentrations of children in poverty families (20 percent or more) were found in the Southern tier of States, extending as far north as West Virginia and as far west as New Mexico.

The distribution of children in families receiving public assistance differs somewhat from the pattern for poverty children. States which had more than 10 percent of their children in families receiving public assistance generally bordered or were east of the Mississippi and included two major groups: Southern States (such as Georgia, Kentucky, Louisiana, Mississippi, South Carolina and Tennessee) or populous, urban, industrial States such as Illinois, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio and Pennsylvania. Also included in the high public assistance States were California and New Mexico.

In 1976, 23.1 percent of all children in the United States aged 5-17 were from minority groups (includes Black non-Hispanic, American Indian/Alaskan Native, Asian or Pacific Islander, Hispanic, and nonresident alien). It has already been noted, however, that many States differ significantly from this national proportion. Highest concentrations of minority children (over 30 percent) are found in the South and Southwest, with only slightly lower concentrations (20 to 29 percent) in populous urban States such as New York, Illinois, Maryland and New Jersey. The concentration of Hispanic children is limited to the Southwest. Of the six States with over 10 percent, five of them--Arizona, California, Colorado, New Mexico, and Texas--are in this region. The distribution of children with limited English-speaking ability is similar to the distribution of Hispanic children among the States.

In comparison with other special student needs populations, the distribution of handicapped children aged 5 to 17 is much more uniform across the 50 States and the District of Columbia. While there is some variation in the proportion of handicapped children, e.g., from 4.9 percent in Alaska to 9.0 percent in Lousiana, pupils residing in 39 States are within plus or minus 1 percent of the United States average of 6.5 percent.

These figures on special populations permit the analysis, at the State level, of effects of additional costs for the education of these pupils. While there is no agreement as to what additional level of resources provides adequate compensation for special needs, the application of hypothetical weights is possible. Several alternatives were explored; the results of three alternative sets of weights applied to the State level data base are shown in table 3.27. The first alternative, treating pupils in unduplicated groups, weights handicapped pupils at 2.0 times pupils not in a special classification group, and other special classification populations at 1.5 times those not specially classified. The second alternative provides for the same weightings as the first, but allows duplicate counting of the handicapped so that handicapped pupils also identified in another classification would receive 2.5 times the resources of those not in any special classification. The third alternative does not allow duplicate counts of handicapped pupils, but instead allows a weight of 2.5 for pupils who are both handicapped and in another special group.

National averages for core expenditure per pupil with weightings of State enrollments for special populations are of course lower than the figures without weights, because weights have the effect of increasing the pupil count while not affecting the expenditures distributed among pupils. In general, applying weights to pupils in special classifications increases the amount of observed dispersion.

TABLE 3.27

SELECTED MEASURES OF DISPERSION OF CORE CURRENT EDUCATION EXPENDITURE PER PUPIL ADJUSTED1/ FOR PUPILS IN SPECIAL CLASSIFICATIONS, BY STATE
UNITED STATES, 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

MEASURE	VALUE BASED ON PUPILS WEIGHTED AS FOLLOWS: UNDUPLICATED COUNT: REGULAR PUPILS=1.0 HANDICAPPED=2.0 OTHER SPECIAL CLASSIFICATION=1.5	DUPLICATED COUNT: REGULAR PUPILS=1.0 HANDICAPPED =2.0 HANDICAPPED ALSO IDENTIFIED IN ANOTHER SPECIAL CLASSICATION=2.5 OTHER SPECIAL CLASSICICATION, NOT HANDICAPPED=1.5	UNDUPLICATED COUNT: REGULAR PUPILS=1.0 ANY SPECIAL CLASSIFICATION PUPIL =1.5
HIGH STATE VALUE	$2140	$2104	$2433
LOW STATE VALUE	$572	$543	$691
RATIO OF HIGH TO LOW STATE VALUE	3.7	3.9	3.5
OUTSIDE 15% ABOVE OR BELOW UNITED STATES AVERAGE			
NUMBER OF STATES	33	32	27
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	62.7	63.7	54.9
UNWEIGHTED MEAN (AVERAGE OF STATE AVERAGES)	1013	992	1139
STANDARD DEVIATION	272	227	294
COEFFICIENT OF VARIATION(X100)	26.8	26.9	25.8
WEIGHTED BY PUPILS MEAN (UNITED STATES AVERAGE)	1025	999	1164
STANDARD DEVIATION	243	232	262
COEFFICIENT OF VARIATION(X100)	23.7	23.3	22.4
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	26.5	26.7	25.2

1/ STATE AVERAGE CORE CURRENT EXPENDITURE PER PUPIL IS ADJUSTED TO ALLOW FOR A LARGER EXPENDITURE FOR EACH PUPIL IN A SPECIAL CLASSIFICATION. THIS IS ACCOMPLISHED BY COUNTING EACH SPECIAL CLASSIFICATION PUPIL AS 1.5 OR MORE AS SPECIFIED ABOVE. THIS RESULTS IN AN OVER-STATEMENT OF THE ACTUAL PUPIL COUNT AND CONSEQUENTLY REDUCES THE AVERAGE PER PUPIL EXPENDITURE OTHERWISE CALCULATED.

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.
SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE; AND, SURVEY OF INCOME AND EDUCATION, UNPUBLISHED TABULATIONS.

The coefficient of variation, which was 21.4 for the distribution of States weighted only by enrollment, increases to 26.8, 26.9 and 25.8 for the three weighting alternatives described here. Ratios of high to low States values also increase, from 3.2 to 3.7, 3.9 and 3.5. While the State level analysis is obviously performed at such a general level that it may mask important detail, the increased values in the dispersion measures suggest that slight increases in dispersions could well result from more refined weightings.

Cost of Living

Variations in the cost of living for different regions or localities across the country also have been cited as a primary reason why expenditure differences do not reflect differences in resources for education. The possible influence of such legitimate cost differentials has been addressed insofar as possible. While cost of education indexes that would parallel cost of living measures have been proposed and studied, the absence of an accepted measure was the reason that this study of resource variations did not throughout use expenditure figures "corrected" to accomodate cost differences. The possible impact of such a correction was investigated, however. A cost of living measure developed by the National Center for Economic Alternatives was used to adjust core expenditure by cost-of-living differences at the State level. 3/. The measure was applied to State per pupil average core expenditure, and summary statistics for this distribution were calculated (tables 3.28 and 3.29). The summary dispersion statistics presented earlier in table 3.2 are repeated here to facilitate the review of the impact of this adjustment. The effect of using adjusted figures for the basis of measuring the resource distributions was to reduce substantially the size of among-State dispersions. The ratio of high to low State values dropped from 3.2 for unadjusted figures to 1.9 for adjusted figures. The number of States outside of 15 percent above and below the United

TABLE 3.28

AVERAGE CORE CURRENT EDUCATION EXPENDITURES PER PUPIL UNADJUSTED AND ADJUSTED FOR ESTIMATED COST OF LIVING DIFFERENCES, BY STATE: 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

STATE OR OTHER AREA	UNADJUSTED EXPENDITURES		ADJUSTED EXPENDITURES	
	AMOUNT	RANK	AMOUNT	RANK
UNITED STATES...	$1389	--	$1389	--
ALABAMA.....	1091	48	$1[illegible]94	45
ALASKA.....	2866	1	1913	1
ARIZONA.....	1342	24	1414	19
ARKANSAS.....	895	50	1[illegible]35	50
CALIFORNIA.....	1614	8	1567	10
COLORADO.....	1419	21	1421	18
CONNECTICUT	1481	16	1389	22
DELAWARE.....	1596	8	1683	3
DIST OF COLUMBIA	1913	3	1850	2
FLORIDA.....	1206	31	1307	23
GEORGIA.....	1045	42	1[illegible]07	35
HAWAII.....	1537	13	1352	33
IDAHO.....	991	46	1[illegible]02	51
ILLINOIS.....	1499	23	1384	24
INDIANA.....	1121	35	1131	44
IOWA.....	1427	20	1457	15
KANSAS.....	1364	26	1395	20
KENTUCKY.....	998	49	1060	48
LOUISIANA.....	1015	45	1173	37
MAINE.....	1049	41	1063	47
MARYLAND.....	1545	11	1596	7
MASSACHUSETTS...	1717	5	1516	12
MICHIGAN.....	1546	10	1488	13
MINNESOTA.....	1520	14	1482	14
MISSISSIPPI.....	891	51	1038	49
MISSOURI.....	1116	37	1134	43
MONTANA.....	1479	17	1592	8
NEBRASKA.....	1411	22	1463	16
NEVADA.....	1235	27	1305	26
NEW HAMPSHIRE...	1163	32	1150	41
NEW JERSEY.....	1780	4	1868	9
NEW MEXICO.....	1158	33	1157	40
NEW YORK.....	1937	2	1679	4
NORTH CAROLINA..	1026	44	1163	38
NORTH DAKOTA....	1231	28	1378	30
OHIO.....	1227	29	1276	31
OKLAHOMA.....	1113	38	1306	25
OREGON.....	1593	7	1694	6
PENNSYLVANIA....	1856	9	1528	11
RHODE ISLAND....	1492	15	1385	21
SOUTH CAROLINA..	971	47	1097	46
SOUTH DAKOTA....	1116	36	1157	39
TENNESSEE.....	1037	43	1106	36
TEXAS.....	1164	26	1309	27
UTAH.....	1077	40	1139	42
VERMONT.....	1303	25	1391	29
VIRGINIA.....	1213	30	1279	32
WASHINGTON.....	1461	19	1634	17
WEST VIRGINIA...	1092	39	1239	34
WISCONSIN.....	1663	18	1604	20
WYOMING.....	1562	17	1650	5
PUERTO RICO	N.A.	N.A.	N.A.	N.A.

N.A. = NOT APPLICABLE.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED STATE-DATA FILE.

TABLE 3.29

SELECTED MEASURES OF DISPERSION OF ADJUSTED CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, BY STATE: UNITED STATES, 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

MEASURE	VALUE
HIGH STATE VALUE	$1912
LOW STATE VALUE	$1032
RATIO OF HIGH TO LOW VALUES	1.9
OUTSIDE 15% ABOVE OR BELOW UNITED STATES AVERAGE	
NUMBER OF STATES	21
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	27.9
UNWEIGHTED	
MEAN (AVERAGE OF STATE AVERAGES)	1344
STANDARD DEVIATION	212
COEFFICIENT OF VARIATION (X100)	15.8
WEIGHTED BY PUPILS	
MEAN (UNITED STATES AVERAGE)	1380
STANDARD DEVIATION	183
COEFFICIENT OF VARIATION (X100)	13.3
COEFFICIENT OF VARIATION (X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	15.4

NOTE: SEE APPENDIX FOR DEFINITIONS OF TERMS.
SOURCE: SAME AS TABLE 3.28.

States average dropped from 27 to 21 (or 22.2 percent) but the percent of the nation's pupils residing in the States with these extreme averages dropped even more, from 57.1 to 27.9, a 49.4 percent decline.

Unfortunately, no index of living costs is available for sub-State level analyses across States. Intuitively, expenditure differences within States also could be attributable to regional cost differences, particularly in States with both sizable metropolitan and rural areas. The higher Theil coefficients for within-State expenditure variations for many States with diverse geographic regions lend some credence to this hypothesis. The absence of suitable indexes to employ to adjust data for these differences is one of the more serious problems hampering analyses at this time.

Multiple Factors

The several factors contributing to expenditure variations have thus far been considered separately. In reality, numerous factors contribute simultaneously to expenditure differences. Of the four factors considered here--school system size, metropolitan status, special needs of pupils, and cost of living differentials-- the last two factors were observed to affect measures of distributions at the State level. Limitations of the adjustments used here caution against interpreting these findings as definitive. Yet, they are clearly illustrative of the kinds of change which could be expected in results if more precise knowledge of resources required for pupils with special needs and more thorough cost of education differentials were available.

To explore the effect of cost-of-living and special needs populations simultaneously, both adjustments were applied to State level averages for core expenditure. The results, together with repeated presentations of unadjusted figures and single adjustments, are shown in table 3.30. The effect of combining adjustments is to reduce dispersion from that obtained with unadjusted

TABLE 3.30

SELECTED MEASURES OF DISPERSION OF CORE CURRENT EDUCATION EXPENDITURE PER PUPIL, UNADJUSTED AND ADJUSTED1/ FOR PUPILS IN SPECIAL CLASSIFICATIONS, AND COST OF LIVING, BY STATE: UNITED STATES, 1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

	1976-77 UNADJUSTED	ADJUSTED FOR COST OF LIVING	VALUE BASED ON PUPILS WEIGHTED AS FOLLOWS: UNDUPLICATED COUNT: REGULAR PUPIL=1.0 ANY SPECIAL CLASSIFICATION PUPIL=1.5	ADJUSTED FOR COST OF LIVING AND FOR SPECIAL CLASSIFICATION PUPIL
HIGH STATE VALUE	$2864	$1912	$2433	$1624
LOW STATE VALUE	881	1032	691	814
RATIO OF HIGH TO LOW STATE VALUE	3.2	1.9	3.5	2.0
OUTSIDE 15% ABOVE OR BELOW UNITED STATES AVERAGE				
NUMBER OF STATES	27	21	27	19
PERCENT OF PUPILS IN THE NATION RESIDING IN THESE STATES	57.1	27.9	54.9	28.2
UNWEIGHTED				
MEAN (AVERAGE OF STATE AVERAGES)	1336	1344	1139	1146
STANDARD DEVIATION	340	212	294	191
COEFFICIENT OF VARIATION(X100)	25.5	15.8	25.8	16.6
WEIGHTED BY PUPILS				
MEAN (UNITED STATES AVERAGE)	1380	1380	1166	1166
STANDARD DEVIATION	295	183	262	161
COEFFICIENT OF VARIATION(X100)	21.4	13.3	22.4	14.3
COEFFICIENT OF VARIATION(X100) (UNWEIGHTED STANDARD DEVIATION/UNITED STATES AVERAGE)	24.7	15.4	25.2	16.3

1/ STATE AVERAGE CORE CURRENT EXPENDITURE PER PUPIL IS ADJUSTED TO ALLOW FOR A LARGER EXPENDITURE FOR EACH PUPIL IN A SPECIAL CLASSIFICATION. THIS IS ACCOMPLISHED BY COUNTING EACH SPECIAL CLASSIFICATION PUPIL AS 1.5 OR MORE AS SPECIFIED ABOVE. THIS RESULTS IN AN OVER-STATEMENT OF THE ACTUAL PUPIL COUNT AND CONSEQUENTLY REDUCES THE AVERAGE PER PUPIL EXPENDITURE OTHERWISE CALCULATED.

NOTE: SEE APPENDIX FOR FORMULAS AND DETAILS OF CALCULATIONS.
SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

amount per pupil, it should reduce the Theil coefficients, as it does (table 3.31). Among State dispersion decreases by almost 15 percent and within State dispersion by only 6 percent. This result indicates that part of the measured among State dispersion arises from State assignment of the financial responsibility for certain education purposes, with consequent differences among States in data. Alternatives which would permit refined examination of this proposition are (1) the total elimination of retirement payments from core current expenditures; or (2) the examination of only salary expenditures per pupil. The salary alternative is suggested because of the small value for the among State share of the Theil coefficient for teachers per 1,000 pupils.

The exclusion of retirement and social security payments understates the dispersion in expenditure that exists, particularly if the quality and quantity of personnel employed or their wage is affected by differences in retirement provisions. However, since States and school systems not only vary in their retirement provisions but also in the degree to which their expenditures actually meet the retirement provisions, the exclusion of retirement and social security payments gives a lower bound to real dispersion. When applied to the data, this adjustment reduced the among State disparity by almost 23 percent. As would be expected, within State disparity was virtually unaffected, since retirement benefit provisons are usually Statewide for teachers and other educational personnel. The notable exceptions are city retirement systems for large cities such as Denver, Colo; Fulton County, Ga; Chicago, Ill.; Des Monies, Iowa, Wichita, Kansas; Duluth, Minneapolis, and St. Paul, Minn; Kansas City and St. Louis, Mo; Omaha, Neb., and Portland, Oregon. There area also some local supplements like those of Montgomery County, Maryland. The removal of these local retirement expenditures did reduce slightly the within State Theil coefficient in these instances.

Table 3.31

EFFECTS OF DATA ADJUSTMENTS TO THE SCHOOL SYSTEM LEVEL DATA BASE ON DISPERSION OF CORE EXPENDITURE PER PUPIL: 1976-77

Core current education expenditure per pupil	Total	Decomposed Theil Coefficient	
		Among State	Within State
Unadjusted Theil Coefficient	50.4	34.9	15.5
Adjusted Theil Coefficient			
Adding State and Intermediate expenditure per pupil to each school system core current expenditure	44.9	30.2	14.6
Excluding all retirement and social security payments	42.3	27.0	15.3
Adjusting for State-to-State cost of living differences	30.6	15.0	15.5
Adjusting for both retirement and cost-of-living differences	27.1	11.8	15.3
Only Salary Expenditure Per Pupil ...	36.1	21.4	14.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Merged School-District Data File, 1976-77.

data, but increase dispersion slightly from that reported after making cost of living adjustments. The ratio of high to low States becomes 2.0 with 19 States and 28.2 percent of the nation's pupils still showing State average expenditures outside of 15 percent above and below the national average.

The effect of these adjustments is so substantial that further research, to permit more accurate treatment of these known influencing factors, is clearly needed. These and other research agenda items are discussed in Chapter 8.

Impact of Data Components on Measured Resource Variations

In addition to the various demographic or economic factors that have been mentioned, reported disparities in educational resources could also be attributable to differences in spending or accounting practices or organizational characteristics. Chapter 2 identified some of the more notable of these differences; Chapter 7 will review potential problems relating to differences in data across States. A review of the effects of some of these known differences on the statistics reporting among State dispersion is useful as one aspect of studying factors contributing to measured disparities. Similar investigations related to within State differences might, if time permitted, yield analogous results.

For example, one major difference in the State level and school system level data bases is the exclusion from the school system data base of expenditures made on behalf of pupils by States and Intermediate Education Agencies. The amount varies by State from $4 to $201 per pupil with a national average of $100 per pupil. A major component of this State expenditure is contributions to retirement systems. Data do not exist to make exact adjustments to compensate for the effects of different procedures across States but approximations can be attempted. One such adjustment is to add the State and Intermediate expenditure per pupil for the State to each local school system expenditure per pupil in the State. Since this adjustment adds a constant

It has already been observed that a cost of education index for differences in prices among States and school systems does not exist. The adjusted per pupil expenditures from the State level data base using a cost index developed by the National Center for Economic Alternatives applied to State averages were shown in table 3.29 and the resulting reductions in dispersion reported in table 3.30. This same adjustment was applied to the per pupil expenditure figures for each school system in the school system level data base to examine the effect of price differences on educational expenditures among States. The result was a 57 percent reduction in the among State dispersion. The within State Theil coefficient did not change because every school system's expenditure per pupil in a given State was multiplied by a constant, making no correction for within State differences in prices.

If both the retirement and cost of living adjustments are made to the school system level data base, the resulting reduction in the value of the Theil coefficient attributable to among-State differences is 66 percent. In other words, only a third of the observed value of the Theil coefficient may be due to a real disparity. Some of that remaining disparity could be attributable to differences in pupil needs among States, and some to differences among school systems in prices and some to staffing differences related to school system enrollment size.

Since the several data adjustments were made among States and not among school systems within States, the remaining within State Theil coefficients for the Nation probably overstate the within State component of disparity in absolute terms as well as relative to the among State measures. Within State adjustments might yield similiar reductions of the within State Theil coefficient.

The 23 percent reduction of the among State Theil coefficient when retirement and social security is removed, the 57 percent reduction of the among

State Theil when expenditures are adjusted for cost-of-living, and the 66 percent reduction of the among State Theil when both retirement and cost-of-living adjustments are made, would indicate that the Theil coefficients calculated from the school system level data base overstate the actual measure of among State disparity. States and school systems do vary in dollars provided but portions of the differences may be due to the assignment of responsiblity for functions such as retirement or cost differences among States. Because provisions for assigning responsibilities and dispersing funds do vary among States, remedial action intended to provide equal services to pupils probably should not be the same under existing circumstances as it would be if it were correcting for real differences in services to pupils.

Summary

This chapter has both examined the extent of reported resource variations among and within States and reviewed several factors which could contribute to the reported dispersions. Variations in expenditures were considerably greater than were variations in the real resource measure of classroom teachers per 1,000 pupils. It also was noted that greater variation of expenditures existed among States than within, while the variation of classroom teachers within States exceeded that among States.

The exploration of contributing factors identified several demographic or data based factors that appear to explain portions of the observed dispersions. Correcting or adjusting data to remove some of these differences had the effect of reducing the measured dispersions, in some cases markedly. The adjustment for cost of living differences, while not acceptable as a substitute for a cost-of-education index, made the single most sizeable reduction in dispersion, underscoring the need for a more refined cost-of-education index.

However, the various reductions in measured among State dispersions which were obtained could detract from an even more important conclusion, namely, that

dispersion in educational resources does remain despite adjustments and refinements to data. While measured disparity can be greatly affected by the particular data elements used, none of the single or compounded adjustments made to reduce the measured disparities had the effect of reducing it beyond a certain point. Thus while available measures do perhaps overstate disparities, it appears that disparities do remain at some level. Under these circumstances, it may be that further analysis should be directed to relative or comparative dispersions, while simultaneously pursuing efforts to establish the true bounds of disparity through improvements in data comparability. The major conclusion of this review of data components is that dispersion in expenditures among States may not be ameliorated directly by solutions such as providing equal dollars to all pupils without first directing greater attention to reasons for the observed dispersion.

It is also appropriate to repeat some of the limitations of the analysis that have already been mentioned. These limitations are of particular importance to those intending to use these results to formulate or apply policy regarding distributions of resources. In general, it has been observed that geographic and organizational features do play a significant role in the distributions of resources that now exist. Comparisons of resource distributions showed differences that might be attributable to such factors as population density or cost differences. The examination of other factors showed some States having distributions for which school system size and metropolitan status were significant explanatory features. This result occured in the States of Kentucky and Tennessee; it may be that the two findings are essentially the same for these States, with large systems occuring only in metropolitan areas. Because of the apparently close tie of geography to resource distribution,

results showing changes over time may reflect circumstantial, and not deliberate, change as well.

Organizational features may also affect the calculated statistics. In the extreme case of one State-wide system, such as Hawaii, disparity measures equal zero. This would be the case for any other State which reorganized in this manner, even if pre-reorganization expenditure patterns continued. In the case of Hobson vs. Hansen, the court ruled that resource disparities existed within the District of Columbia school system, even though any disparity measure for the District of Columbia would have equalled zero. It was already noted that data for a single year for a single State could be misleading, as in the case of Arizona. Chapter 7 identifies other States with particular data characteristics that could affect the validity or comparability of results. Those States that have county unit school systems, and hence generally larger systems, tend to have smaller within State dispersion measures than do other States.

Both of these sets of observations may be summarized by cautioning that statistics must be intepreted within the context of applicable geographic and organizational features. In particular, policy prescriptions that assume strict comparablity of reported figures may be problematic.

Chapter 3
Footnotes

1/ A discussion of data categories is included in Chapter o; complete definitions are contained in the glossary.

2/ The code is described in Chapter 7.

3/ Details of the measure are described in Chapter 7.

Chapter 4

Wealth Neutrality

The previous chapter documented variations in the distribution of educational expenditure and teachers both among and within States. The assignment to study the disparity from wealth neutrality requires that the analysis consider also the relationships between these educational resources and the wealth of the local community. The concept of wealth neutrality requires that educational resources available to students must be independent of the wealth of their community. The concept is too complex to be represented by a single statistical measure; several measures were considered and employed on an exploratory basis. The analyses presented here should be interpreted as a status report on wealth neutrality rather than a definitive work on the subject.

The severe limitations in the data currently available for these analyses relating to wealth neutrality were mentioned in Chapter 2 and are described further in Chapter 7. As a result of these problems, while the analyses of disparity in expenditure and in teachers per 1,000 pupils were presented from a national perspective using data at the school system level, the analyses of disparity from wealth neutrality were not possible at the same level on a national basis.

The concept "wealth neutrality" has been used by the courts as a negative standard. That is, existing State support plans have been held to violate the principle of "wealth neutrality". The California Supreme Court in the case of Serrano vs Priest, in 1976, ruled that the system of public school finance in California was invalid because the system made the quality of a child's education dependent upon the resources of his school district. The decision implied that a system of financing education which was not related to school district resources would be "wealth neutral." The court action did not, however, result in a definitive positive norm for wealth neutrality.1/

A correlation coefficient of zero between expenditure per pupil and wealth per pupil, under certain circumstances, could characterize a situation that would be considered "wealth neutral." Likewise, an elasticity or a regression coefficient of zero, when expenditures per pupil are regressed on wealth per pupil, could also be "wealth neutral." This report concentrates on statistical tests of the results of funding mechanisms, that is, State and local revenues per pupil.

Wealth has been variously defined as personal income, adjusted gross income, reported household income, residential property values, owner-occupied property values, and varied other combinations of either income and property. For the purposes of this study, wealth will be taxable assessed property valuation as defined by the various States. This choice was based mainly on considerations of data availability, with some attention to its theoretical basis. The only data available on a school-system-by-school-system basis are reported household income and taxable assessed property valuation. Reported household income is available only for 1970 and therefore was not considered for use in this study. However, taxable assessed property valuation is available in some form for all local education agencies in a State for 1976-77. For the other years, data from a sample of local education agencies are available. For 12 States, only taxable assessed valuation for school systems is available. For 37 States, taxable assessed property valuation, equalized to a common standard within the State, is available. The common standard for equalized property valuations among school systems within a State is some percentage of full valuation but rarely 100 percent. Thus, equalized valuations are not comparable from State to State. Property valuations also are not comparable from State to State in terms of property assessed for taxation, or in the treatment of property classes when taxed by several States.2/

There are known methods for placing State-by-State aggregates on a comparable basis for different State definitions of taxable property, and for the different percentages taxable assessed property valuations are of full market value. However, these methods cannot be accomplished with available data on a school system basis. The cost of assembling such data on a school system basis has been prohibitive in the past and promises to remain so for the forseeable future. For these and other reasons, all analyses except one on State aggregates are for school systems within States. No statistical comparisons among States on a school system basis are attempted, although the results of the within States analyses are presented for each State.

Governmental Sources of Revenue

The educational services provided by local school systems are financed by a combination of Federal, State and local revenues. States have the constitutional responsibility to provide for education. The States delegate the authority to levy local taxes to local boards of education to finance educational services for students. The States retain the power to "equalize" local resources in order to ensure a minimal standard of educational program financing. States vary in the exercise of their control over revenue collection and resource distribution.

The increases in revenues for education and the changing shares of support by source are presented in table 4.1. Chart 4.1 shows the relative shares of the Federal, State and local contributions to revenues for public education. Despite the relative stability in the proportions of support, two important trends are observable from these data.

First, the figures indicate the increasing Federal role in education funding. They show that funding for the educational programs already in place in 1960 accelerated after 1965 with the passage of the Elementary and Secondary Education

Table 4.1—Revenue receipts of public elementary and secondary schools from Federal, State, and local sources: United States, 1955-56 to 1978-79

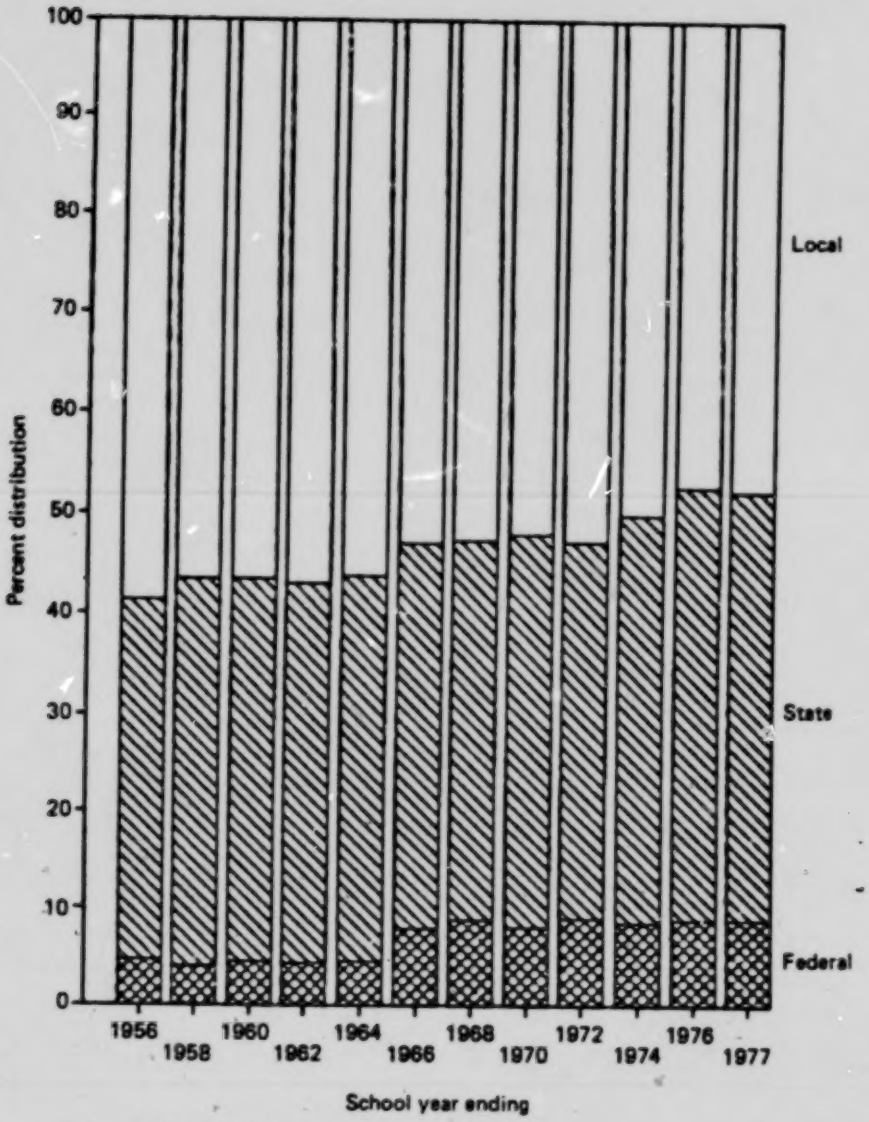
School year	Amount in thousands of dollars				School year	Percentage distribution			
	Total	Federal	State	Local (including intermediate)[1]		Total	Federal	State	Local (including intermediate)[1]
1955-56	9,686,677	441,442	3,828,886	5,416,350	1955-56	100.0	4.6	39.5	55.9
1957-58	12,181,513	486,484	4,800,366	6,894,661	1957-58	100.0	4.0	39.4	56.6
1959-60	14,746,618	651,539	5,768,047	8,326,932	1959-60	100.0	4.4	39.1	56.5
1961-62	17,527,707	730,975	6,789,190	9,977,542	1961-62	100.0	4.3	38.7	56.9
1963-64	20,544,182	896,956	8,078,014	11,569,213	1963-64	100.0	4.4	39.3	56.3
1965-66	25,356,858	1,996,954	9,920,219	13,439,686	1965-66	100.0	7.9	39.1	53.0
1967-68	31,903,064	2,806,469	12,275,536	16,821,063	1967-68	100.0	8.8	38.5	52.7
1969-70	40,266,923	3,219,557	16,062,776	20,984,589	1969-70	100.0	8.0	39.9	52.1
1971-72	50,003,645	4,467,969	19,133,256	26,402,420	1971-72	100.0	8.9	38.3	52.8
1973-74	58,230,892	4,930,351	24,113,409	29,187,132	1973-74	100.0	8.5	41.4	50.1
1975-76	71,206,073	6,318,345	31,776,101	33,111,627	1975-76	100.0	8.9	44.6	46.5
1976-77	75,322,532	6,629,498	32,688,903	36,004,134	1976-77	100.0	8.8	43.4	47.8

[1] Includes a relatively small amount from nongovernmental sources (gifts and tuition and transportation fees from patrons). These sources accounted for 0.4 percent of total revenue receipts in 1967-68.

NOTE.—Beginning in 1959-60, includes Alaska and Hawaii. Because of rounding, details may not add to totals.

SOURCES: U.S. Department of Education, National Center for Education Statistics, *Statistics of State School Systems*, and *Revenues and Expenditures for Public Elementary and Secondary Education, 1977-78* and *1978-79*.

Chart 4.1
Revenue Receipts of Public Elementary and Secondary Schools from Federal, State, and Local Sources, United States: 1955-56 to 1976-77



Source: Table 4.1

Act. While the level, in percentage terms, has fluctuated since then, the amount was substantial enough to exert a noticeable shift in the proportions of revenue by source of funds. Second, it may be seen that in response to differences in the ability of localities to support education, many States have increased their role in funding. Since 1970, the beginning of the most recent period of school finance reform, at least 25 States have enacted legislation designed to more equitably distribute resources available for education to the pupils receiving it.

The courts' concerns over the equity of funding are related to the problems arising from unequal local revenues. Therefore, in considering wealth neutrality, the source of funds is an important factor. The analysis of the distribution of educational expenditures presented in the previous chapter did not attempt to distinguish expenditures from revenues derived from particular sources.

The distribution of Federal revenues across States varies considerably, ranging from 4.9 to 37.9 percent. Among States in 1976-77, 24 States received between 6.5 and 12.0 percent of revenues from Federal sources. Most Federal programs are designed to assist particular groups of pupils having special needs, or to accomplish particular objectives. Hence the distribution of funds suggests an uneven incidence of needs across States. Amounts and percents of revenues per pupil by source for the States are shown in tables 4.2 and 4.3 for 1969-70 and 1976-77.

Variables Used to Examine Wealth Neutrality

Earlier approaches to the study of equitable support for public education suggest concepts that should be examined as part of this analysis. Wealth and effort require definition and measures, as do sources of funds for education, property values per pupil, property tax rates, and expenditures per pupil. Both the dispersion of these variables among and within States and their interrelatedness are of importance.

TABLE 4.2

REVENUE PER PUPIL FOR PUBLIC ELEMENTARY AND SECONDARY SCHOOLS, BY SOURCE ,BY STATE: 1969-70

(INCLUDES REVENUES FOR ALL PUBLIC SCHOOL PUPILS)

STATE OR OTHER AREA	TOTAL AMOUNT	AMOUNT AND PERCENT BY SOURCE					
		FEDERAL		STATE		LOCAL	
		AMOUNT	PERCENT	AMOUNT	PERCENT	AMOUNT	PERCENT
UNITED STATES....	$870	$70	8.0	$367	39.9	$453	52.1
ALABAMA.....	570	105	18.4	344	60.3	122	21.4
ALASKA.....	1397	287	22.3	758	58.1	356	19.7
ARIZONA.....	940	101	12.0	407	48.5	332	39.5
ARKANSAS.....	548	104	19.9	249	43.8	204	37.3
CALIFORNIA.....	1047	61	5.9	334	31.9	657	62.2
COLORADO.....	846	86	10.2	322	26.2	538	63.6
CONNECTICUT	938	41	4.5	661	67.7	462	47.8
DELAWARE.....	1167	91	8.9	863	74.0	223	19.1
DIST OF COLUMBIA	1174	303	25.8	0	0.0	971	74.2
FLORIDA.....	815	87	10.7	448	55.0	280	34.3
GEORGIA.....	649	93	14.3	364	53.8	212	32.7
HAWAII.....	1044	115	11.0	895	85.8	34	3.3
IDAHO.....	676	79	11.6	265	39.2	333	49.2
ILLINOIS.....	1064	83	5.8	331	31.1	650	63.9
INDIANA.....	709	43	6.0	280	39.4	387	54.5
IOWA.....	966	52	5.4	260	26.8	674	69.8
KANSAS.....	843	66	7.8	263	31.2	514	61.0
KENTUCKY.....	641	113	17.6	334	52.2	194	30.3
LOUISIANA.....	692	83	12.0	309	46.2	220	31.9
MAINE.....	788	59	7.5	292	37.4	429	55.0
MARYLAND.....	963	70	9.2	330	34.3	555	57.6
MASSACHUSETTS...	970	80	8.1	224	22.9	704	72.0
MICHIGAN.....	879	42	4.8	395	45.0	441	50.2
MINNESOTA.....	1024	82	8.0	485	47.4	477	46.6
MISSISSIPPI.....	559	117	20.9	295	52.7	148	26.4
MISSOURI.....	772	57	7.4	262	33.3	473	61.3
MONTANA.....	918	52	5.7	222	24.2	644	70.2
NEBRASKA.....	736	56	7.6	142	19.3	537	73.1
NEVADA.....	855	86	10.1	305	35.7	483	56.2
NEW HAMPSHIRE...	796	56	7.0	95	11.9	466	81.1
NEW JERSEY.....	1051	57	5.4	283	26.9	713	67.7
NEW MEXICO.....	758	142	18.7	464	61.3	152	20.0
NEW YORK.....	1297	67	5.1	597	46.0	631	48.9
NORTH CAROLINA..	659	107	16.2	392	59.4	160	24.3
NORTH DAKOTA....	824	114	13.9	211	25.6	499	60.6
OHIO.....	784	45	5.7	213	27.1	527	67.2
OKLAHOMA.....	628	84	13.7	243	38.7	306	48.7
OREGON.....	936	51	5.5	705	21.9	679	72.6
PENNSYLVANIA....	980	69	8.1	454	46.3	466	47.6
RHODE ISLAND....	914	62	6.7	355	38.9	497	54.4
SOUTH CAROLINA..	680	103	15.2	404	59.7	171	25.1
SOUTH DAKOTA....	739	101	13.9	99	13.6	539	72.5
TENNESSEE.....	613	89	14.6	282	46.1	241	39.3
TEXAS.....	661	76	11.5	305	46.1	280	42.3
UTAH.....	723	70	9.7	374	51.7	279	38.6
VERMONT.....	1020	61	5.9	414	40.3	553	53.8
VIRGINIA.....	772	109	14.1	272	35.2	392	50.7
WASHINGTON.....	929	67	7.3	518	55.8	343	36.9
WEST VIRGINIA...	698	98	13.6	369	52.9	234	33.5
WISCONSIN.....	926	62	6.6	279	30.1	603	65.1
WYOMING.....	870	74	8.5	321	36.9	475	54.6
PUERTO RICO.....	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE.

TABLE 6.3

REVENUE PER PUPIL FOR PUBLIC ELEMENTARY AND SECONDARY SCHOOLS, BY SOURCE, BY STATE: 1976-77

(INCLUDES REVENUES FOR ALL PUBLIC SCHOOL PUPILS)

STATE OR OTHER AREA	TOTAL AMOUNT	AMOUNT AND PERCENT BY SOURCE					
		FEDERAL		STATE		LOCAL	
		AMOUNT	PERCENT	AMOUNT	PERCENT	AMOUNT	PERCENT
UNITED STATES...	$1700	$180	8.8	$738	43.4	$819	47.9
ALABAMA.....	1175	193	16.4	719	61.2	263	22.4
ALASKA.....	3387	276	8.4	2381	72.8	650	19.7
ARIZONA.....	1745	174	10.0	865	49.6	706	40.4
ARKANSAS.....	1136	177	15.6	566	49.8	393	34.6
CALIFORNIA.....	1891	162	8.6	765	40.4	964	51.0
COLORADO.....	1925	134	6.4	715	37.3	1096	56.4
CONNECTICUT ...	1998	86	5.3	394	24.7	1170	70.1
DELAWARE.....	2012	196	9.7	1378	68.5	439	21.8
DIST OF COLUMBIA	2094	795	37.9	1299	62.1	0	0.0
FLORIDA.....	1629	166	10.2	867	53.2	596	36.6
GEORGIA.....	1191	152	12.8	557	46.8	482	40.4
HAWAII.....	1737	241	13.9	1697	96.1	0	0.0
IDAHO.....	1312	148	11.6	518	42.8	553	45.7
ILLINOIS.....	1817	119	6.5	696	38.3	1002	55.1
INDIANA.....	1497	86	5.9	729	49.4	681	44.7
IOWA.....	1753	101	5.8	665	38.0	986	56.3
KANSAS.....	1537	128	8.3	606	39.4	803	52.3
KENTUCKY.....	1264	173	13.7	725	57.4	366	29.0
LOUISIANA.....	1377	268	19.0	739	53.6	391	28.4
MAINE.....	1294	119	9.2	575	44.4	600	46.4
MARYLAND.....	1968	151	7.7	779	39.6	1038	52.7
MASSACHUSETTS..	2261	113	5.0	715	31.6	1434	63.4
MICHIGAN.....	1840	118	6.4	823	44.5	898	49.1
MINNESOTA.....	2012	121	6.0	1167	58.0	725	36.0
MISSISSIPPI....	1017	336	33.3	579	56.9	202	19.9
MISSOURI.....	1343	127	9.4	487	36.3	729	54.3
MONTANA.....	1786	175	9.7	997	55.8	714	39.8
NEBRASKA.....	1571	121	7.7	358	19.6	1142	72.7
NEVADA.....	1519	111	7.3	548	36.1	860	56.6
NEW HAMPSHIRE..	1386	82	5.9	115	8.3	1189	85.8
NEW JERSEY.....	2129	128	6.0	784	36.8	1218	57.2
NEW MEXICO.....	1474	314	21.3	912	61.9	247	16.8
NEW YORK.....	2382	142	5.9	925	38.8	1315	55.2
NORTH CAROLINA.	1234	192	15.7	787	63.8	266	21.5
NORTH DAKOTA...	1579	195	11.8	685	43.6	702	44.7
OHIO.....	1636	92	5.6	583	40.6	762	53.8
OKLAHOMA.....	1615	171	13.1	753	43.2	491	36.7
OREGON.....	1986	164	8.3	509	25.6	1313	66.1
PENNSYLVANIA...	1891	165	8.7	845	44.7	881	46.6
RHODE ISLAND...	1629	142	8.7	520	31.9	967	59.4
SOUTH CAROLINA.	1304	222	17.0	711	54.5	371	28.5
SOUTH DAKOTA...	1467	196	13.4	253	17.3	1000	69.1
TENNESSEE.....	1246	156	12.5	599	48.1	491	39.4
TEXAS.....	1665	171	11.7	683	46.7	610	41.7
UTAH.....	1380	126	9.0	749	53.9	505	36.6
VERMONT.....	1869	113	6.0	662	37.0	1095	85.3
VIRGINIA.....	1526	168	11.0	496	32.4	863	55.6
WASHINGTON.....	1694	155	9.1	1020	60.1	521	30.7
WEST VIRGINIA..	1370	167	10.8	833	60.8	399	28.3
WISCONSIN.....	1742	85	4.9	626	36.0	1030	59.2
WYOMING.....	2015	143	7.1	587	29.1	1285	63.8
PUERTO RICO....	836	188	26.3	649	73.7	0	0.0

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED STATE-DATA FILE, 1976-77.

Wealth. One way of defining wealth is personal income per capita. Another way is property values per pupil. These two variables were studied at the State level in relation to core current expenditures per pupil as part of this study. State personal income per capita and core expenditure per pupil by State for 1976-77 are listed in table 4.4 and compared in chart 4.2. The strong positive relationship between the distributions of the two variables that is apparent visually is substantiated by a correlation coefficient of .89, suggesting that high expenditures per pupil do occur in States with high personal incomes per capita. However, when personal income per capita and core expenditure per pupil are adjusted for cost of living differences, the correlation between the adjusted variables reduces to .57. Personal income enters into investigations of school finance because it is an important component of taxpaying ability. However, it was excluded from the school system level analysis reported here.

Property valuation offers a measure of wealth that is particularly important to the present analysis because of the historic use of property tax revenues as the primary local source of funding for public schools. For this study, property values were equalized to an estimated full-market value national standard. These State values per pupil were also compared to State core expenditure per pupil (chart 4.3 and table 4.5). The correlation of these property values per pupil by State with State core expenditure per pupil was .07. Comparing this correlation coefficient with that for personal income and expenditure highlights the importance of the choice of the measure of wealth in determining wealth neutrality.

Taxable Property Valuation. Full-market value property valuations equalized to a national standard are not available on a school-system basis. Therefore, school district wealth is defined for purposes of this analysis as taxable

TABLE 4.4

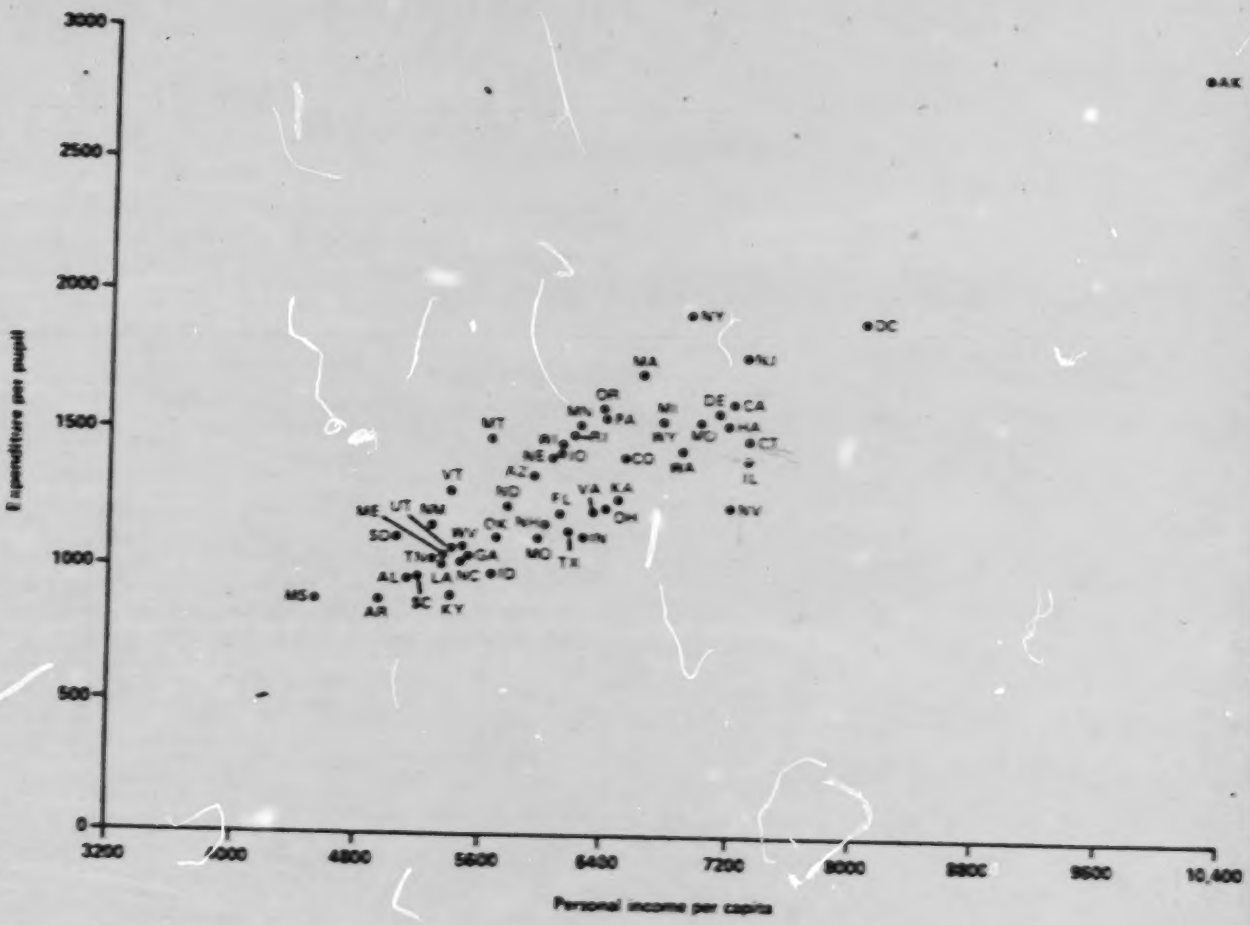
CORE CURRENT EXPENDITURE PER PUPIL AND PERSONAL INCOME PER CAPITA, BY STATE: UNITED STATES,1976-77

(INCLUDES EXPENDITURES FOR ALL PUBLIC SCHOOL PUPILS)

STATE	CORE CURRENT EDUCATION EXPENDITURE PER PUPIL	PERSONAL INCOME PER CAPITA
UNITED STATES....	1188	6396
ALABAMA.....	961	5178
ALASKA.....	2864	10254
ARIZONA.....	1342	5931
ARKANSAS.....	885	6949
CALIFORNIA.....	1614	7219
COLORADO.....	1415	6523
CONNECTICUT	1481	7312
DELAWARE.....	1596	7122
DIST OF COLUMBIA	1913	8071
FLORIDA.....	1206	6181
GEORGIA.....	1045	5511
HAWAII.....	1537	7188
IDAHO.....	981	5659
ILLINOIS.....	1499	7318
INDIANA.....	1121	6256
IOWA.....	1427	6185
KANSAS.....	1264	6475
KENTUCKY.....	998	5607
LOUISIANA.....	1015	5367
MAINE.....	1049	5389
MARYLAND.....	1545	6994
MASSACHUSETTS...	1717	6827
MICHIGAN.....	1566	6766
MINNESOTA.....	1528	6227
MISSISSIPPI.....	881	4539
MISSOURI.....	1116	5963
MONTANA.....	1479	5648
NEBRASKA.....	1411	6052
NEVADA.....	1235	7202
NEW HAMPSHIRE...	1163	6001
NEW JERSEY.....	1785	7299
NEW MEXICO.....	1158	5205
NEW YORK.....	1937	6929
NORTH CAROLINA..	1026	5647
NORTH DAKOTA....	1231	5758
OHIO.....	1227	6395
OKLAHOMA.....	1113	5788
OREGON.....	1593	6374
PENNSYLVANIA....	1556	6399
RHODE ISLAND....	1497	6186
SOUTH CAROLINA..	971	5191
SOUTH DAKOTA....	1116	5843
TENNESSEE.....	1037	5293
TEXAS.....	1164	6158
UTAH.....	1077	5419
VERMONT.....	1293	5601
VIRGINIA.....	1213	6315
WASHINGTON.....	1441	6894
WEST VIRGINIA...	1092	5476
WISCONSIN.....	1443	6123
WYOMING.....	1542	6766

SOURCE: TABLE 3.8, U.S. DEPARTMENT OF COMMERCE, OFFICE OF ECONOMIC ANALYSIS, UNPUBLISHED DATA.

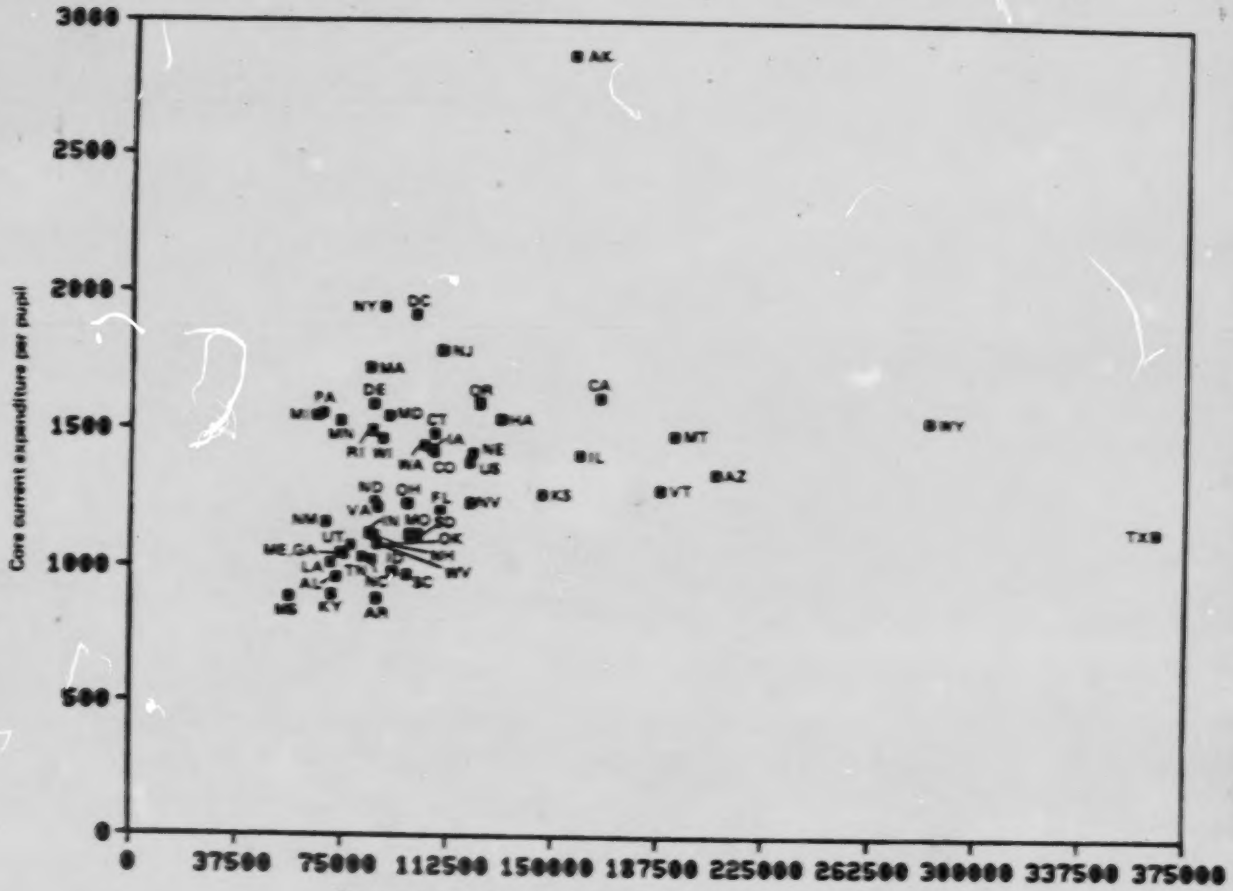
Chart 4.2
Personal Income Per Capita, 1976, and Core Current Education Expenditure Per Pupil, 1976-77, by State



Source: Table 4.4

Chart 4.3

Property value per pupil, 1976, and core current education expenditure per pupil, 1976-77, by State



Source: Table 4.5

TABLE 4.3

STATE AVERAGE CORE CURRENT EDUCATION EXPENDITURE PER PUPIL AND PROPERTY VALUATION PER PUPIL, BY STATE: UNITED STATES, 1976-77

(INCLUDES EXPENDITURES AND PROPERTY VALUES FOR ALL PUBLIC SCHOOL PUPILS)

STATE	CORE CURRENT EXPENDITURE PER PUPIL	ESTIMATED EQUALIZED FULL MARKET VALUE PROPERTY VALUATION PER PUPIL
UNITED STATES....	$1309	$129294
ALABAMA.....	981	73672
ALASKA.....	2864	155675
ARIZONA.....	1342	207422
ARKANSAS.....	885	87135
CALIFORNIA.....	1614	146313
COLORADO.....	1415	197431
CONNECTICUT	1491	197689
DELAWARE.....	1586	84006
DIST OF COLUMBIA	1813	198592
FLORIDA.....	1206	108597
GEORGIA.....	1065	79893
HAWAII.....	1537	131158
IDAHO.....	981	82776
ILLINOIS.....	1604	149226
INDIANA.....	1121	86744
IOWA.....	1427	[illegible]
KANSAS.....	1266	104035
KENTUCKY.....	990	71320
LOUISIANA.....	1015	71026
MAINE.....	1040	74684
MARYLAND.....	1535	91164
MASSACHUSETTS...	1717	96827
MICHIGAN.....	1546	68916
MINNESOTA.....	1420	73953
MISSISSIPPI.....	891	56276
MISSOURI.....	1114	98954
MONTANA.....	1479	107581
NEBRASKA.....	1411	121025
NEVADA.....	1334	139235
NEW HAMPSHIRE...	1141	86921
NEW JERSEY.....	1705	149880
NEW MEXICO.....	1158	89194
NEW YORK.....	1937	89654
NORTH CAROLINA..	1026	85337
NORTH DAKOTA....	1231	95340
OHIO.....	1227	98368
OKLAHOMA.....	1113	94515
OREGON.....	1593	173816
PENNSYLVANIA....	1534	87717
RHODE ISLAND....	1497	93589
SOUTH CAROLINA..	971	97960
SOUTH DAKOTA....	1116	101909
TENNESSEE.....	1037	92156
TEXAS.....	1146	144148
UTAH.....	1077	77894
VERMONT.....	1393	107770
VIRGINIA.....	1213	97547
WASHINGTON.....	1481	123455
WEST VIRGINIA...	1092	87294
WISCONSIN.....	1663	98961
WYOMING.....	1642	203651

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM REVISED SCHOOL DISTRICTS DATA FILE.

property valuation per pupil, as assessed or equalized by each State. Differences in property values suggest the differences in amounts of educational resources that would be available from revenues if each system were required to be self-sufficient. If there were no State and Federal aid to assist school systems with smaller tax bases or systems with special needs or conditions, assuming a uniform or near-uniform property tax across all systems, differences in expenditures would be expected to parallel taxable property valuation differences.

The distribution of taxable property valuation per pupil among school systems for each State is summarized by table 4.6. It shows the statewide mean, 5th percentile, and 95th percentile for unified systems in each State, and the basis (equalized or assessed) on which the distribution is calculated. The concept of taxable property values represented in table 4.6 differs from that represented in table 4.5. Whereas the values shown in table 4.5 were equalized to a national standard, table 4.6 shows property values equalized in 37 States to that State's standard. The reader should note the differences in State values between the two tables; for example, South Carolina has a per-pupil value of $57,940 in table 4.5 and only $3,255 in table 4.6, a value less than 4 percent of the one in table 4.5.

For several reasons, figures on property valuations at the school system level are not comparable across States. Property valuations may include only real property in some States, and both real and personal property in other States. Furthermore, for some States, only data on assessed property valuations are available. In other cases, equalized property valuations were obtained, but identical proportions of market values were not always used in adjusting data. Furthermore, States differ in their methods and timing of assessing property to tax for education. The figures on assessed property values are particularly troublesome because the

TABLE 6.6

TAXABLE PROPERTY VALUATION PER PUPIL, BY STATE: 1976

(FOR SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	AVERAGE, 5TH PERCENTILE, 95TH PERCENTILE LEVELS OF TAXABLE PROPERTY VALUE AND DIFFERENCE BETWEEN THE 5TH AND 95TH PERCENTILES				NUMBER OF SCHOOL SYSTEMS INCLUDED
	AVERAGE (MEAN)	5TH PERCENTILE	95TH PERCENTILE	DIFFERENCE: 95TH-5TH	
STATES WITH STATE EQUALIZED PROPERTY VALUES					
ALASKA	397625	884032	890550	840518	37
ARKANSAS	39118	19565	71761	52196	369
CALIFORNIA	21884	10836	45181	35145	394
CONNECTICUT	84385	44750	144926	100176	109
DELAWARE	32640	16955	50683	44629	22
GEORGIA	72297	41011	120571	83860	184
IDAHO	58826	31861	110998	79137	105
ILLINOIS	25678	10552	43314	32762	436
INDIANA	37371	20154	62311	42157	295
IOWA	69868	34507	131921	97414	449
KANSAS	81219	38569	184468	145892	306
KENTUCKY	52332	20113	83188	62987	176
LOUISIANA	26597	9938	61369	51419	66
MAINE	45626	19645	83189	63484	114
MARYLAND	86122	32183	89628	57445	24
MASSACHUSETTS	54469	24936	81559	56623	177
MICHIGAN	84455	29253	97237	67984	526
MINNESOTA	55969	25896	88213	62317	436
MISSOURI	59603	24667	106952	81385	951
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.
NEVADA	74619	58966	109888	50962	16
NEW HAMPSHIRE	56268	33302	99682	66380	67
NEW JERSEY	70635	23773	132581	108808	383
NEW MEXICO	22377	9960	67645	57785	87
NEW YORK	68982	30273	100814	70241	669
NORTH DAKOTA	19521	5695	18262	12567	252
OHIO	90795	46843	147381	100538	612
OKLAHOMA	75976	29133	157337	128204	634
PENNSYLVANIA	37021	18622	62898	44236	500
RHODE ISLAND	65695	40849	90806	49957	29
SOUTH DAKOTA	82118	32140	159694	127554	181
TEXAS	91309	23876	167904	144030	963
VERMONT	57572	28683	68960	40187	34
VIRGINIA	71684	40269	128785	88516	132
WASHINGTON	76988	40584	137313	96728	347
WEST VIRGINIA	38529	21530	67148	45618	55
WISCONSIN	69791	45542	96056	50514	330
STATES WITH ASSESSED VALUATION					
ALABAMA	9482	4984	13447	8458	123
ARIZONA	12651	4443	32459	28015	74
COLORADO	15832	7329	25795	18435	177
DIST OF COLUMBIA	68396	68396	68396	0	1
FLORIDA	63986	32821	92663	59842	67
HAWAII	66948	66948	66948	0	1
MISSISSIPPI	8685	3376	23431	20054	150
NEBRASKA	18716	8129	37231	29102	293
NORTH CAROLINA	36575	18675	91470	67990	137
OREGON	77489	49247	198134	83888	154
SOUTH CAROLINA	3255	1787	5237	3449	92
TENNESSEE	13878	5966	31884	16049	137
UTAH	10162	6884	16911	10027	40
WYOMING	27613	9437	78179	68731	41

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, REVISED SCHOOL-DISTRICT DATA FILE, 1976-77.

assessment practices may not be comparable even within a given State. Notwithstanding, these are the most comparable data available at this time for school systems. These problems are greatly magnified in any analysis across States. Therefore, it is not appropriate to calculate summary measures of dispersion for property values for the United States, or to compare State averages.

The summary measures of dispersion used in the previous chapter to describe the distributions of educational resources are shown for property valuation for each State in table 4.7. Dispersion measures for the 14 States with assessed valuation are shown separately from those States with a calculated equalized property value because of the comparability problems among these data. The dispersion statistics are considerably greater for per pupil property valuation by school system than for per pupil educational resources by school systems.

Computational Tax Rate. Effort is another important component in the analysis of wealth neutrality. Effort in this study is measured by the computational tax rate. The local levy for education is the product of tax rate times assessed and taxable property in the school system. Thus, both taxable property values and tax rates are factors affecting the availability of resources at the local level. Although actual tax rates were collected, they were so inconsistent they were deemed unuseable. Therefore tax rates were computed by dividing local education revenues from property taxes (plus, for dependent school systems, parent government contributions) by property valuation for each school system. Care should be exercised not to confuse the tax rate computed by a board of education with the computational tax rate as defined operationally for use in this study.

Data summarizing distributions of local school "computational tax rates" for States are shown in table 4.8. The statewide average or mean, 5th and 95th percentile values and the coefficient of variation of the resulting State

TABLE 4.7

SELECTED MEASURES OF DISPERSION OF TAXABLE PROPERTY VALUE PER PUPIL, BY STATE: 1976

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12; SCHOOL SYSTEM AVERAGES WEIGHTED BY ENROLLMENT)

STATE OR OTHER AREA	RATIO OF 95TH TO 5TH PERCENTILE	COEFFICIENT OF VARIATION (X100)	GINI COEFFICIENT (X100)	THEIL COEFFICIENT (X1000)
STATES WITH STATE EQUALIZED PROPERTY VALUES				
ALASKA	1.4	21.5	9.0	27.5
ARKANSAS	3.7	44.6	22.3	98.9
CALIFORNIA	4.5	40.*	22.9	97.9
CONNECTICUT	3.0	41.5	21.0	74.8
DELAWARE	4.7	39.0	17.3	59.0
GEORGIA	3.0	59.8	30.9	184.4
IDAHO	3.5	42.9	20.3	76.0
ILLINOIS	4.1	43.1	20.7	89.2
INDIANA	3.1	41.5	19.4	44.1
IOWA	3.0	44.2	22.*	96.0
KANSAS	4.0	48.1	27.4	139.1
KENTUCKY	4.1	39.6	22.1	79.2
LOUISIANA	6.2	63.0	33.8	183.7
MAINE	4.7	57.2	25.0	118.6
MARYLAND	2.0	35.5	19.1	59.7
MASSACHUSETTS	2.8	42.7	19.5	68.1
MICHIGAN	3.3	42.0	20.5	75.7
MINNESOTA	3.4	40.4	21.0	78.5
MISSOURI	4.3	49.3	24.3	102.0
MONTANA	N.A.	N.A.	N.A.	N.A.
NEVADA	1.8	33.6	11.0	38.4
NEW HAMPSHIRE	1.0	43.8	19.4	79.5
NEW JERSEY	5.6	51.4	27.7	126.0
NEW MEXICO	6.0	92.2	35.2	265.2
NEW YORK	5.3	39.5	18.3	58.6
NORTH DAKOTA	3.2	38.2	20.*	68.2
OHIO	3.1	38.2	19.5	62.6
OKLAHOMA	4.6	75.1	31.1	180.9
PENNSYLVANIA	3.6	40.9	20.7	73.7
RHODE ISLAND	2.2	27.1	13.1	28.5
SOUTH DAKOTA	4.8	57.8	27.3	177.2
TEXAS	6.9	69.7	32.3	214.9
VERMONT	2.4	43.5	18.1	71.9
VIRGINIA	3.0	43.8	20.7	77.3
WASHINGTON	3.4	49.3	23.6	99.1
WEST VIRGINIA	2.9	34.9	19.4	59.3
WISCONSIN	2.1	80.1	17.1	175.1
STATES WITH ASSESSED VALUATION				
ALABAMA	7.7	35.0	19.2	58.7
ARIZONA	6.3	116.1	35.1	316.6
COLORADO	3.5	75.4	27.1	153.6
DIST OF COLUMBIA	1.0	0.0	0.0	0.0
FLORIDA	2.8	47.9	22.0	91.1
HAWAII	1.0	0.0	0.0	0.0
MISSISSIPPI	6.6	58.0	29.6	146.3
NEBRASKA	4.6	44.5	21.0	84.9
NORTH CAROLINA	3.0	43.6	22.1	83.0
OREGON	2.6	36.8	17.3	55.2
SOUTH CAROLINA	2.9	31.0	17.1	47.4
TENNESSEE	3.1	49.1	25.4	108.1
UTAH	2.7	57.5	22.4	110.4
WYOMING	2.0	79.3	30.0	256.9

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, "FINANCE SCHOOL-DISTRICT DATA FILE, 1976-77.

TABLE 4.8

LOCAL SCHOOL COMPUTATIONAL TAX RATE, BY STATE: 1976-77

(FOR SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	AVERAGE, 5TH PERCENTILE, 95TH PERCENTILE LEVELS AND DIFFERENCE BETWEEN THE 5TH AND 95TH PERCENTILES				COEFFICIENT OF VARIATION (X100)	NUMBER OF SCHOOL SYSTEMS INCLUDED
	AVERAGE (MEAN)	5TH PERCENTILE	95TH PERCENTILE	DIFFERENCE 95TH - 5TH		
STATES WITH STATE EQUALIZED PROPERTY VALUES						
ALASKA	8.4	5.6	11.4	5.8	18.8	27
ARKANSAS	9.1	7.8	10.9	3.9	14.1	369
CALIFORNIA	46.1	32.3	53.3	21.0	59.5	354
CONNECTICUT	18.3	8.4	22.0	13.6	27.7	109
DELAWARE	12.8	4.3	18.9	14.6	40.1	22
GEORGIA	6.7	2.9	9.5	6.6	132.5	184
IDAHO	7.7	4.6	13.6	9.0	34.0	105
ILLINOIS	31.5	20.0	48.5	28.5	28.2	436
INDIANA	17.3	12.9	24.1	11.3	20.0	295
IOWA	11.4	7.9	16.8	8.9	30.6	449
KANSAS	10.3	6.9	12.3	5.4	78.0	304
KENTUCKY	5.4	3.1	7.9	4.8	29.6	176
LOUISIANA	7.9	2.8	14.5	11.7	48.8	66
MAINE	12.3	9.7	15.7	6.0	21.1	114
MARYLAND	18.6	14.2	22.5	8.3	13.7	24
MASSACHUSETTS	27.9	18.4	40.2	21.8	25.2	177
MICHIGAN	15.7	12.1	20.3	8.2	18.1	526
MINNESOTA	11.8	6.3	15.4	9.1	26.9	436
MISSOURI	10.2	6.8	12.9	6.4	43.3	451
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEVADA	7.8	5.7	7.4	1.7	8.1	16
NEW HAMPSHIRE	20.1	11.6	26.4	14.8	19.3	87
NEW JERSEY	19.7	10.8	21.8	10.5	21.9	303
NEW MEXICO	11.3	7.2	15.9	8.8	23.3	87
NEW YORK	20.8	13.4	29.5	17.0	22.9	660
NORTH DAKOTA	50.8	3.8	78.2	74.7	97.8	253
OHIO	8.3	5.4	13.1	7.7	35.9	612
OKLAHOMA	5.7	2.8	9.2	6.4	35.9	454
PENNSYLVANIA	18.2	10.9	27.0	16.1	27.8	500
RHODE ISLAND	16.1	13.3	20.3	7.0	13.2	39
SOUTH DAKOTA	11.9	6.7	17.2	10.5	30.4	181
TEXAS	10.7	3.4	12.1	8.8	231.0	965
VERMONT	16.7	12.7	26.1	13.4	21.3	34
VIRGINIA	11.5	6.4	15.9	9.5	26.3	132
WASHINGTON	5.8	1.1	11.3	10.2	90.3	247
WEST VIRGINIA	9.3	6.5	12.0	5.5	17.6	55
WISCONSIN	11.9	8.4	14.7	6.2	83.7	330
STATES WITH ASSESSED VALUATION						
ALABAMA	10.8	4.0	20.9	16.9	32.5	123
ARIZONA	37.6	31.3	81.8	50.5	35.5	70
COLORADO	68.4	49.0	94.5	45.5	21.2	177
DIST OF COLUMBIA	1.9	1.9	1.9	0.0	0.0	1
FLORIDA	7.6	6.6	8.0	1.4	10.9	67
HAWAII	33.4	22.4	22.6	22.4	22.4	1
MISSISSIPPI	27.9	17.1	38.1	21.0	86.3	150
NEBRASKA	59.7	38.6	74.7	36.1	30.6	282
NORTH CAROLINA	6.8	2.2	8.3	6.1	65.9	132
OREGON	16.1	11.6	20.6	9.0	30.9	154
SOUTH CAROLINA	106.8	66.7	176.9	108.2	30.5	92
TENNESSEE	32.2	9.0	70.9	61.9	53.0	127
UTAH	45.5	38.0	52.8	14.8	12.4	40
WYOMING	33.1	25.6	42.5	16.9	16.6	41

N.A. = NOT APPLICABLE

NOTE: SINCE THE DISTRICT OF COLUMBIA AND HAWAII OPERATE A SINGLE STATEWIDE SCHOOL SYSTEM, STATE REVENUES ARE CONSIDERED LOCAL FOR PURPOSES OF THIS COMPUTATION.
SEE GLOSSARY FOR DEFINITIONS OF TERMS.
SEE APPENDIX FOR DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED SCHOOL-DISTRICT FILE.

distributions of school system values are shown for each State. The coefficient of variation provides an indication of the magnitude of dispersions in computational tax rates within each State, despite the definitional problems that preclude the calculation of statistical measures of the differences in tax rates among States.

As is the case for data on school system property values, the numerical values shown in the tables do not provide a basis for making comparisons in tax rates among States and should not be used for that purpose. State average tax rates are not comparable for all the reasons property values are not comparable. In addition, the average rates are not comparable, since States differ in the proportion of local revenues for education that they derive from property taxes.

Because of the need to establish some estimates for tax rates that are reasonably comparable across States, estimates of State average tax rates were calculated to permit examination of the diversity in this aspect of the wealth neutrality discussions. Table 4.9 presents estimated average school computational tax rates by State. This is based on estimated full market values of all types of taxable property and on State equalized or assessed valuation. The differences in the two weighted average tax rates shown in table 4.9 again underscore the problems in obtaining comparable figures for statistical analysis.

The distributions of two important components of public school support may be compared graphically. The dispersions in two school system level variables--one an indication of wealth (property valuation per pupil) and one an indication of effort (computational tax rate)--are shown for each State in chart 4.4. The Theil coefficient is the measure of dispersion calculated for the two variables. (Theil coefficients for computational tax rate

TABLE 4.9

AVERAGE SCHOOL COMPUTATIONAL TAX RATE BY STATE: 1976

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE	AVERAGE COMPUTATIONAL TAX RATE IN MILLS BASED ON:		
	ESTIMATED FULL MARKET VALUE OF TAXABLE PROPERTY VALUATION		STATE EQUALIZED OR ASSESSED VALUATION
	UNWEIGHTED	DISTRICT AVERAGE TAX RATE WEIGHTED BY ENROLLMENT (SEE TABLE 4.5)	DISTRICT AVERAGE TAX RATE WEIGHTED BY ENROLLMENT (SEE TABLE 4.6)
ALABAMA	3.60	1.47	10.8
ALASKA	4.18	4.19	8.4
ARIZONA	3.40	3.05	57.6
ARKANSAS	4.51	4.10	9.1
CALIFORNIA	5.80	5.65	46.1
COLORADO	10.11	8.93	68.4
CONNECTICUT	10.40	11.15	15.3
DELAWARE	5.10	4.64	12.0
DISTRICT OF COLUMBIA	1.30	1.29	1.9
FLORIDA	5.44	4.52	7.6
GEORGIA	6.34	5.76	6.7
HAWAII	11.41	11.43	22.4
IDAHO	5.96	4.54	7.7
ILLINOIS	6.29	3.11	31.5
INDIANA	7.68	7.38	17.3
IOWA	9.25	7.19	11.4
KANSAS	5.50	5.17	10.3
KENTUCKY	5.13	3.11	5.4
LOUISIANA	5.51	2.38	7.9
MAINE	8.06	7.23	12.3
MARYLAND	11.39	11.18	18.6
MASSACHUSETTS	16.90	14.56	27.9
MICHIGAN	13.78	12.92	15.7
MINNESOTA	9.80	8.32	11.5
MISSISSIPPI	3.59	3.83	27.9
MISSOURI	7.37	5.94	10.2
MONTANA	N.A.	N.A.	N.A.
NEBRASKA	9.44	9.16	59.7
NEVADA	7.15	4.29	7.0
NEW HAMPSHIRE	13.69	5.62	20.1
NEW JERSEY	11.07	9.30	15.7
NEW MEXICO	3.57	3.34	11.3
NEW YORK	14.67	14.12	20.5
NORTH CAROLINA	3.12	2.83	4.8
NORTH DAKOTA	8.13	5.75	50.8
OHIO	7.77	7.63	8.3
OKLAHOMA	5.68	4.53	5.7
OREGON	10.62	9.51	16.1
PENNSYLVANIA	13.01	10.25	18.2
RHODE ISLAND	11.30	11.51	14.1
SOUTH CAROLINA	3.79	3.47	104.8
SOUTH DAKOTA	9.80	8.48	11.9
TENNESSEE	5.98	4.83	32.2
TEXAS	1.67	1.56	10.7
UTAH	6.47	5.89	45.5
VERMONT	5.78	4.77	16.7
VIRGINIA	9.86	9.21	11.5
WASHINGTON	5.02	3.89	5.8
WEST VIRGINIA	4.47	4.04	9.3
WISCONSIN	11.59	5.17	11.9
WYOMING	4.53	2.87	33.1

N.A. = NOT APPLICABLE

SOURCE: SPECIAL TABULATION U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS.

dispersions are provided in table 4.10). The intent of chart 4.4 is to compare "relative" dispersions, since the statistics for different States are not based on comparable figures. Although caution is advised in interpreting this chart, the primary observation is that the dispersion in property values exceeds the dispersion in computational tax rates for most States.

Measures of Wealth Neutrality

Although many wealth neutrality analyses were conducted, only two--regression and correlation--were promising within the limitations of the data available for analysis. Data problems also precluded the examination of changes in wealth neutrality over time by any of the measures used to examine data for 1976-77. Each measure was calculated using both raw data and natural log-transformed data, resulting in the following four presentations: (1) the correlation between State plus local revenues and property values; (2) the correlation between the logarithmic transformation of State plus local revenues and property values; (3) the regression coefficient relating revenues to property values; and (4) the wealth elasticity 3/ of revenue.

The question of the appropriate designation of units of analysis arises in applying wealth neutrality measures, as it did in considering resource disparities. Treating each system as a single unit ignores the impact of the differences in resources made available to numbers of pupils. Because the language of the court cases has placed an emphasis on classes of pupils and the equitability of the services they receive, the treatment of the wealth neutrality issue from the point of view of pupils is important. In order to provide both perspectives, measures are presented calculated on both a school system basis, where each system counts as a single observation, and on a pupil-weighted basis, with each system's values weighted by the fall enrollment counts. The pupil-weighted figures reflect the assumption that all pupils in

TABLE 4.18

THEIL COEFFICIENTS OF DISPERSION OF SCHOOL SYSTEM COMPUTATIONAL TAX RATES, BY STATE: UNITED STATES (1976-77)

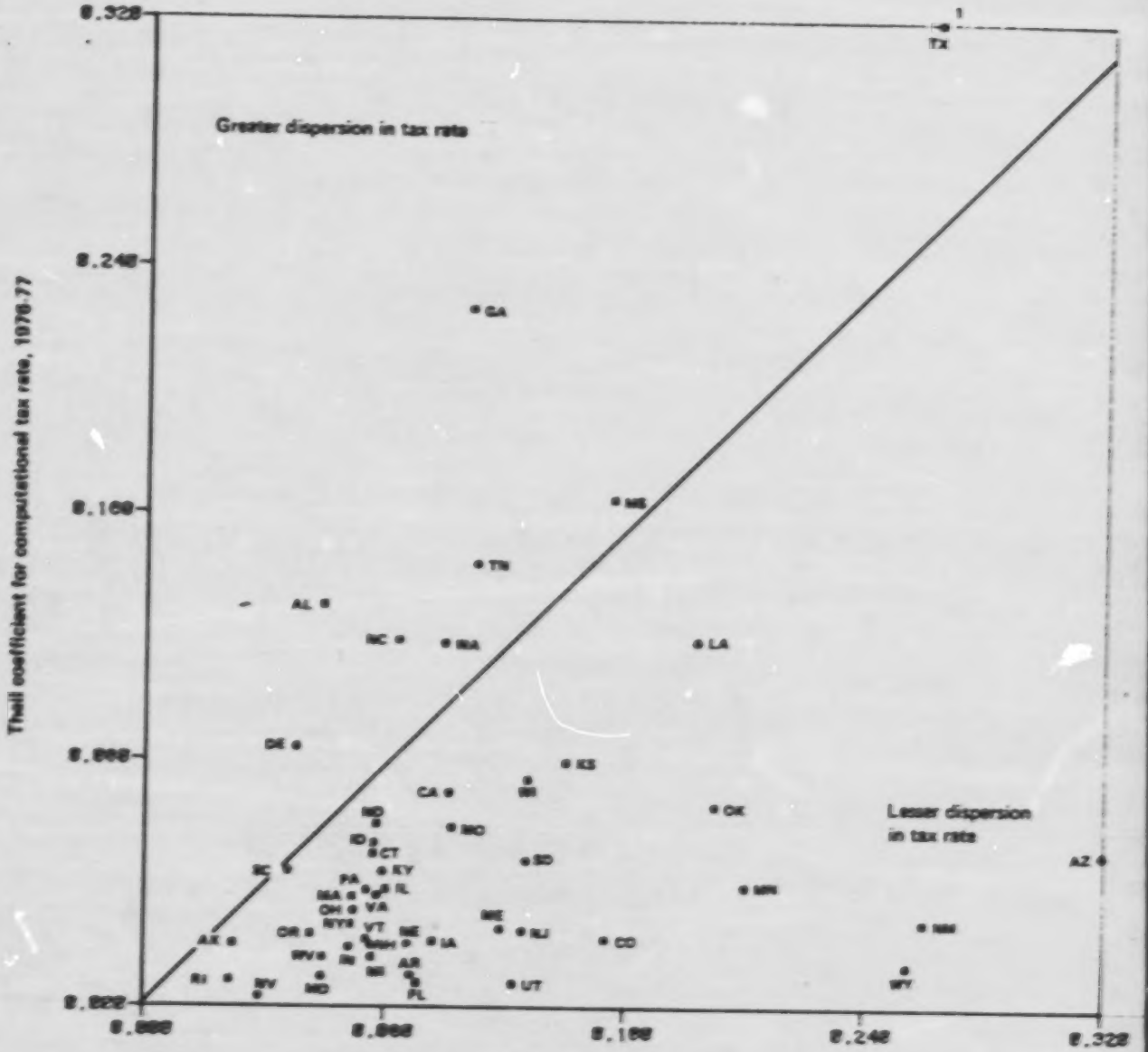
(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12 AND WITH PROPERTY VALUES)

STATE	SCHOOL SYSTEM COMPUTATIONAL TAX RATE THEIL COEFFICIENT (X1000)
ALABAMA	130.5
ALASKA	20.4
ARIZONA	50.6
ARKANSAS	10.5
CALIFORNIA	69.6
COLORADO	22.4
CONNECTICUT	49.3
DELAWARE	84.2
DISTRICT OF COLUMBIA	0.0
FLORIDA	8.8
GEORGIA	226.3
HAWAII	0.0
IDAHO	53.2
ILLINOIS	38.1
INDIANA	19.6
IOWA	21.4
KANSAS	79.7
KENTUCKY	44.8
LOUISIANA	119.8
MAINE	25.6
MARYLAND	9.9
MASSACHUSETTS	35.8
MICHIGAN	16.1
MINNESOTA	39.6
MISSISSIPPI	164.9
MISSOURI	58.4
MONTANA	N.A.
NEBRASKA	28.6
NEVADA	3.5
NEW HAMPSHIRE	29.2
NEW JERSEY	25.8
NEW MEXICO	27.9
NEW YORK	26.8
NORTH CAROLINA	119.8
NORTH DAKOTA	59.5
OHIO	31.4
OKLAHOMA	65.5
OREGON	23.8
PENNSYLVANIA	37.9
RHODE ISLAND	8.7
SOUTH CAROLINA	44.3
SOUTH DAKOTA	47.8
TENNESSEE	143.9
TEXAS	630.8
UTAH	7.8
VERMONT	22.1
VIRGINIA	36.3
WASHINGTON	118.1
WEST VIRGINIA	16.3
WISCONSIN	74.8
WYOMING	13.8

NOTE: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE APPENDIX FOR DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

Chart 4.4
Theil Coefficients for Computational Tax Rate and Property Valuation, by State: 1976-77



[1] Data not comparable because it includes receipts from Public Laws 81-815 and 81-874 as local revenue. Actual value for Texas for computational tax rate is .68003.

[2] See Table 4.8 for type of property valuation.

Sources: Tables 4.7 and 4.10.

a given school system receive an equal share of the system's resources. Graphic presentations show the weighted calculations. Furthermore, weighted values are calculated on the basis of deviation from State per-pupil averages.

Correlation coefficients of State and local revenues per pupil with property values per pupil may be computed several ways. Cofficients may be computed for both unadjusted values and transformed values for school systems treated as individual observations in each State and for school systems weighted by pupil enrollments in each State (table 4.11). A comparison of the correlation coefficients for weighted and unweighted values shows that for weighted values, 22 States have larger coefficients, while 26 have the same or smaller coefficients. Few of the changes in either direction were large and only four of the shifts were of magnitudes exceeding .25. Values of the correlation coefficient for weighted values were less than .19 in only four States; between .60 and .79 in 21 States; and above .80 in five States. This pattern was only slightly changed when the correlations were calculated using logarithmic transformations of the values. Correlation coefficients for equalized values are unaffected by the varying percentage that equalized is of full value across States and therefore comparable across equalized valuation States. States with only assessed valuation cannot be compared with each other or the equalized valuation States.

The relationship of State and local revenue to property valuation within States was also examined using regression analysis. Both simple regression coefficients and regression coefficients on log-transformed values (elasticities) have been computed, using values weighted by school system enrollments. These coefficients are shown in table 4.12. The values of the regression coefficient across States are in part the consequence of the magnitudes being compared. The regression equation relates the range in property values to a much smaller

TABLE 4.11

SELECTED MEASURES OF DISPERSION FROM WEALTH NEUTRALITY, BY STATE: 1976-77

(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE OR OTHER AREA	STATE LOCAL REVENUE PER PUPIL WITH PROPERTY VALUATION PER PUPIL			
	CORRELATION COEFFICIENT (WEIGHTED)	CORRELATION COEFFICIENT (UNWEIGHTED)	CORRELATION COEFFICIENT OF LOG VALUES (WEIGHTED)	CORRELATION COEFFICIENT OF LOG VALUES (UNWEIGHTED)
STATES WITH STATE EQUALIZED PROPERTY VALUATION				
ALASKA	-0.06	-0.11	-0.19	-0.21
ARKANSAS	0.76	0.60	0.67	0.56
CALIFORNIA	0.63	0.59	0.59	0.57
CONNECTICUT	0.79	0.68	0.76	0.71
DELAWARE	0.57	0.58	0.67	0.64
GEORGIA	0.38	0.33	0.53	0.44
IDAHO	0.62	0.57	0.38	0.62
ILLINOIS	0.33	0.49	0.29	0.41
INDIANA	0.69	0.79	0.67	0.65
IOWA	0.47	0.56	0.16	0.19
KANSAS	0.73	0.83	0.79	0.76
KENTUCKY	0.81	0.52	0.76	0.54
LOUISIANA	-0.03	0.16	0.09	0.20
MAINE	0.37	0.59	0.41	0.45
MARYLAND	0.60	0.29	0.54	0.25
MASSACHUSETTS	0.34	0.43	0.33	0.43
MICHIGAN	0.67	0.62	0.60	0.53
MINNESOTA	0.13	0.36	0.55	0.25
MISSOURI	0.75	0.74	0.74	0.70
MONTANA	N.A.	0.00	N.A.	0.00
NEVADA	0.92	0.97	0.86	0.91
NEW HAMPSHIRE	0.61	0.57	0.68	0.66
NEW JERSEY	0.55	0.49	0.55	0.46
NEW MEXICO	0.32	0.21	0.29	0.20
NEW YORK	0.71	0.75	0.71	0.72
NORTH DAKOTA	0.24	0.58	0.50	0.62
OHIO	0.58	0.76	0.68	0.72
OKLAHOMA	0.80	0.87	0.67	0.77
PENNSYLVANIA	0.65	0.62	0.61	0.67
RHODE ISLAND	0.63	0.71	0.70	0.75
SOUTH DAKOTA	0.68	0.72	0.81	0.79
TEXAS	0.64	0.74	0.62	0.73
VERMONT	0.62	0.68	0.62	0.62
VIRGINIA	0.72	0.95	0.70	0.57
WASHINGTON	0.48	0.84	0.36	0.86
WEST VIRGINIA	0.63	0.69	0.67	0.51
WISCONSIN	0.39	0.18	0.24	0.26
STATES WITH ASSESSED VALUATION				
ALABAMA	0.58	0.58	0.60	0.58
ARIZONA	0.50	0.56	0.56	0.68
COLORADO	0.63	0.71	0.76	0.85
DIST OF COLUMBIA	N.A.	0.00	N.A.	0.00
FLORIDA	0.51	0.23	0.71	0.03
HAWAII	N.A.	N.A.	N.A.	N.A.
MISSISSIPPI	0.85	0.73	0.75	0.84
NEBRASKA	0.79	0.76	0.82	0.00
NORTH CAROLINA	0.58	0.36	0.53	0.00
OREGON	0.38	0.44	0.60	0.60
SOUTH CAROLINA	0.69	0.69	0.75	0.69
TENNESSEE	0.42	0.68	0.34	0.67
UTAH	0.78	0.58	0.36	0.34
WYOMING	0.81	0.75	0.78	0.64

NOTES: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE TABLES 4.8 AND 7.1 FOR NUMBERS OF SYSTEMS INCLUDED.

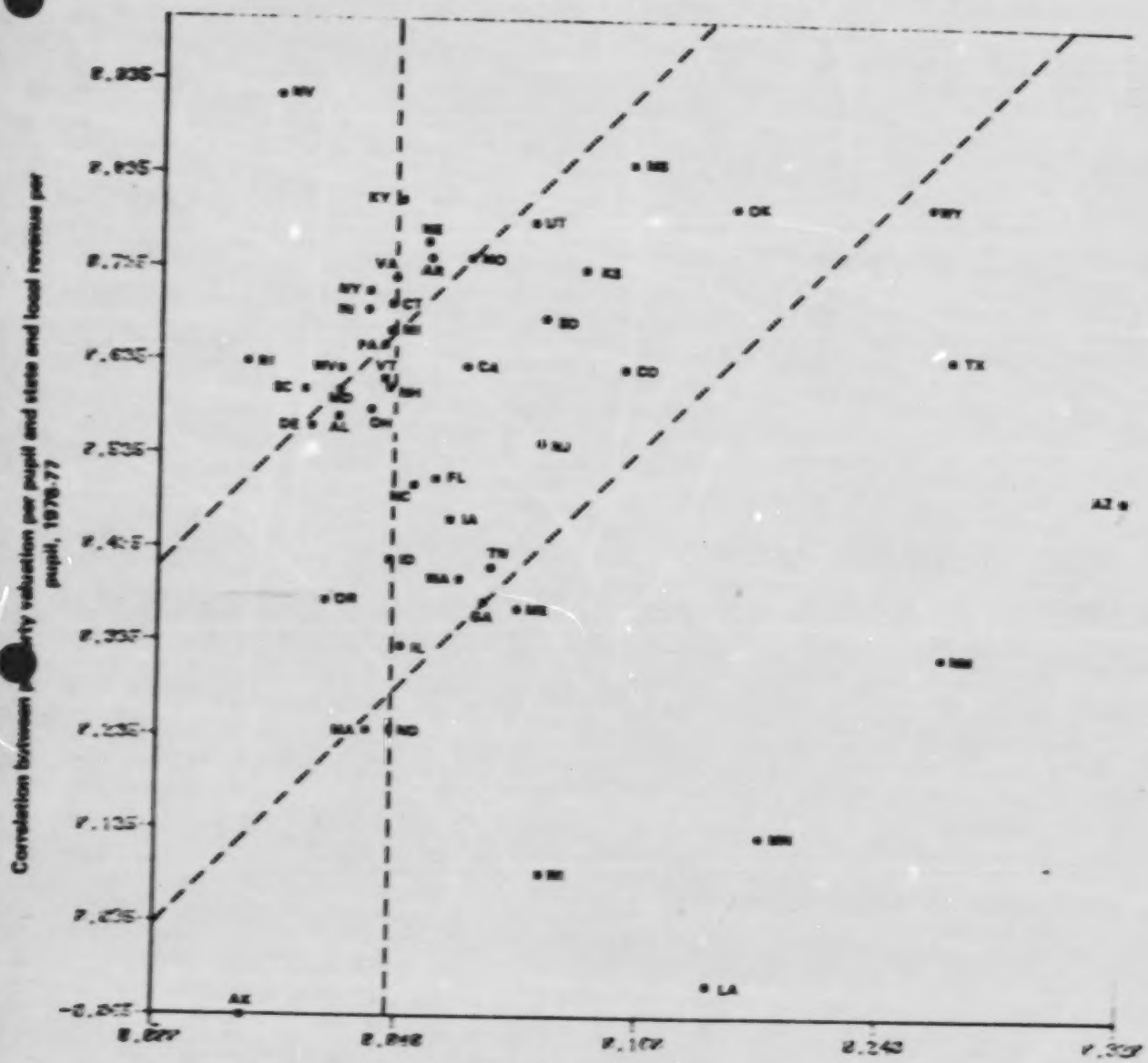
SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, REVISED SCHOOL-DISTRICT DATA FILE.

TABLE 4.12

SELECTED MEASURES OF WEALTH
NEUTRALITY, BY STATE: 1976-77

STATE OR OTHER AREA	[illegible]	PLAINTIFF'S [illegible]
[illegible]		
[illegible]		
[illegible]		

Chart 4.5
Correlation Between Property Valuations and State and Local Revenue, and Theil Coefficient for Property Valuation, by State: 1976-77



[1] See Table 4.8 for type of property valuation

Sources: Tables 4.7 and 4.11

range in revenues. Since most State school finance plans establish minimum levels of support, the range of expenditures per pupil is constrained. It was observed in chapter 3 that the ratio of expenditures per pupil from 95th to 5th percentile within States was at the most 2.2. In contrast, the ratio of the 95th to 5th percentile of taxable property value per pupil (table 4.7) could be as great as 6.8.

Elasticities (regression coefficients of the log-transformed property values per pupil, and State and local revenue per pupil) indicate the percentage increase in revenues per pupil that would accompany percentage increase in property values per pupil. In contrast to regression coefficients, the elasticities are comparable across the 37 States with equalized property values because the log-transformation accounts for the differing State percentages of full value used as an equalization standard.

Multi-dimensional Nature of Wealth Neutrality

There are obvious shortcomings to the use of any single statistic such as correlations, regression coefficients, or elasticities as a standard for wealth neutrality. These shortcomings are illustrated for correlation. The considerable dispersions in one component of these correlations, property valuation per pupil, have already been noted. This dispersion may, however, provide the means for refining the view of wealth neutrality obtained by inspecting the correlation coefficient solely.

Correlation coefficients for property values with State and local revenues may be compared with Theil coefficients for property values. The correlation coefficients and Theil coefficients, both of which were computed using system data weighted by enrollments, are shown for each State in chart 4.5. Among States with approximately the same property value dispersions, the States with lower correlation coefficients are more wealth neutral. For example, Illinois,

is more wealth neutral for unified systems than Pennsylvania and less so than North Dakota.

Inspection of the chart along diagonals, drawn parallel to a 45 degree line through the origin, add other important qualifiers to judgments that might be rendered based on correlation coefficients alone. The choice of the 45 degree line was arbitrary since further research is required to determine a standard relating the two variables and to express that standard in terms of the appropriate slope. Georgia may be as wealth neutral as Massachusetts, though the State has a higher correlation coefficient. The higher disparity in property values in Georgia may be responsible for its higher correlation coefficient. Similarly, Delaware, Maryland, Pennsylvania and Missouri, all States approximately located on a diagonal parallel to one through the origin, could be making the same effort towards wealth neutrality.

Two additional Hypotheses have been advanced in discussions of wealth neutrality. These hypotheses need to be considered jointly. In a clearly non-wealth neutral situation, both hypotheses would be true. The first is that correlations of tax rates and property values will be negative; that is, that high taxes are necessary to support even low spending in poor school systems, while low taxes are sufficient to permit high spending in wealthy systems. The second is that tax rates determine the level of combined State and local revenues, suggesting that there would be a high correlation of tax rates with State and local revenues for those States that had inequitable funding plans. However, if State aid ameliorates differences in revenue from local tax rates among local school systems, then the second hypothesis could not be supported. In this case, the first hypothesis is not meaningful as a test of wealth neutrality.

The two sets of correlations of values for the school systems by State

are listed in table 4.13 and presented graphically in chart 4.6. The correlation values linking tax rates and property values, while predominantly negative, are positive for several States. Furthermore, they are for the most part small, weakening the first hypothesis.

The second hypothesis would be supported by high positive correlation coefficients of tax rates with State and local revenues. In this study, while the correlations are predominantly positive, they are small in absolute values. High correlations do appear for the States of Alabama, Delaware, and New York. However, for Alabama and Delaware the results may be attributed to the fact that those States have levels of State support considerably higher than do most other States (61.2 and 68.5 percent, respectively compared to a national average of 43.4 percent). Only limited amounts of local discretion are possible. Thus, only slight variations in local tax rates could account for the limited variation in State and local revenues observable in these cases.

Consideration of both sets of correlations on a graph simultaneously permits casual inspection of possible systematic relationships between the two distributions of coefficients. However, in this case not only is there limited support for either of the hypotheses alone, but the scattering of States among the four quadrants of the graph suggests that there is virtually no relationship between the two arguments.

The simple relationships postulated to exist between tax rates, property values, and State and local revenues were not found. Data were not available for a more aggressive pursuit of issues concerning wealth neutrality. The analyses do suggest that disparities from wealth neutrality are not as great as had originally been presumed. Additional studies are needed to interpret more fully the significance of these findings.

TABLE 4.13

CORRELATION OF SCHOOL SYSTEM COMPUTATIONAL TAX RATE WITH PROPERTY VALUATION PER PUPIL AND WITH STATE AND LOCAL REVENUE PER PUPIL, BY STATE: UNITED STATES, 1976-77

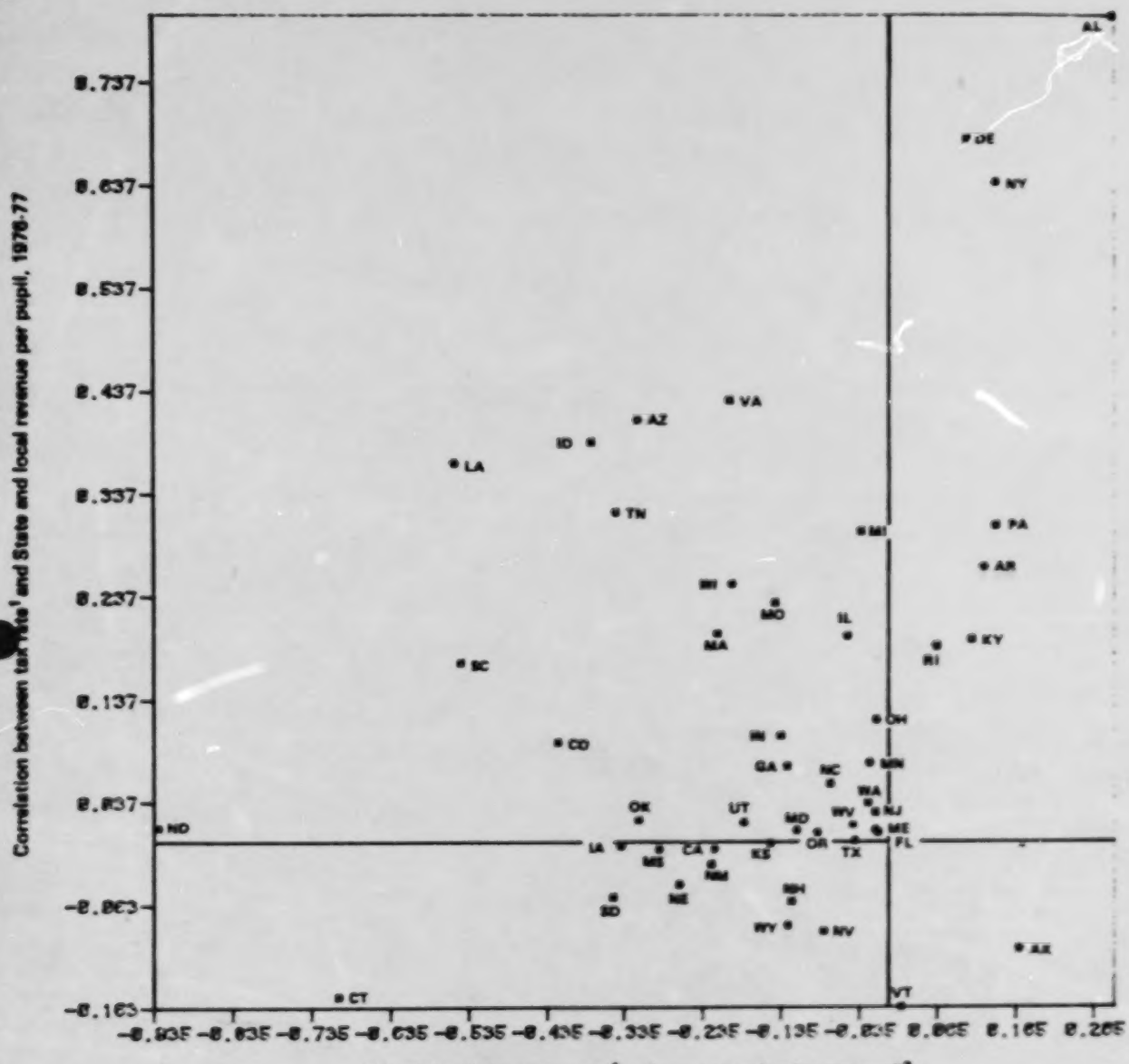
(INCLUDES ONLY SCHOOL SYSTEMS WITH GRADES 1-12)

STATE	CORRELATION COEFFICIENT COMPUTATIONAL TAX RATE AND:	
	PROPERTY VALUATION PER PUPIL (X100)	STATE-LOCAL REVENUE PER PUPIL (X100)
ALABAMA	28.8	80.2
ALASKA	16.9	-10.6
ARIZONA	-31.8	40.9
ARKANSAS	12.5	26.6
CALIFORNIA	-22.0	- 0.8
COLORADO	-41.9	9.6
CONNECTICUT	-70.0	-15.2
DELAWARE	10.2	68.2
DISTRICT OF COLUMBIA	0.0	0.0
FLORIDA	- 1.1	0.8
GEORGIA	-12.7	7.2
HAWAII	0.0	0.0
IDAHO	-37.7	38.8
ILLINOIS	- 5.0	19.9
INDIANA	-13.5	10.2
IOWA	-33.9	- 0.5
KANSAS	-14.8	- 0.3
KENTUCKY	10.9	19.6
LOUISIANA	-55.3	36.7
MAINE	- 1.5	1.1
MARYLAND	-11.5	1.0
MASSACHUSETTS	-21.6	20.1
MICHIGAN	- 3.2	30.1
MINNESOTA	- 2.2	7.6
MISSISSIPPI	-29.0	- 0.8
MISSOURI	-14.2	23.1
MONTANA	0.0	0.0
NEBRASKA	-26.4	- 4.3
NEVADA	- 8.1	- 8.8
NEW HAMPSHIRE	-12.1	- 5.9
NEW JERSEY	- 1.4	2.8
NEW MEXICO	-22.4	- 2.3
NEW YORK	13.9	64.0
NORTH CAROLINA	- 7.2	5.5
NORTH DAKOTA	-92.9	1.3
OHIO	- 1.3	11.8
OKLAHOMA	-31.7	2.0
OREGON	- 8.9	0.8
PENNSYLVANIA	14.0	30.7
RHODE ISLAND	6.5	18.9
SOUTH CAROLINA	-54.5	17.3
SOUTH DAKOTA	-34.9	- 5.5
TENNESSEE	-34.5	32.0
TEXAS	- 4.1	0.0
UTAH	-18.2	1.8
VERMONT	1.9	-16.2
VIRGINIA	-20.0	42.8
WASHINGTON	- 2.3	3.7
WEST VIRGINIA	- 4.3	1.6
WISCONSIN	-19.7	24.9
WYOMING	-12.6	- 8.2

NOTES: SEE GLOSSARY FOR DEFINITION OF TERMS.
SEE APPENDIX FOR DETAILS OF CALCULATIONS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, MERGED DISTRICT-DATA FILE.

Chart 4.6
Correlation Between Tax Rate and State and Local Revenue, and Correlation Between Tax Rate and Property Valuation, by State: 1976-77



[1] Average computational tax rate based on estimated equalized full market value of taxable property valuation.

[2] See Table 4.8 for type of property valuation.

Source: Table 4.13

Chapter 4

Footnotes

1/ A comprehensive discussion of the Serrano case and the measurement problems related to it is provided by Lee S. Friedman, "The Ambiguity of Serrano: Two Concepts of Wealth Neutrality," Hastings Constitutional Law Quarterly, Volume 4, Summer 1977, No. 3.

2/ These differences can be observed in Tables 4.10 and 7.8.

3/ The economic arguments and the formulation of this test are presented in Martin S. Feldstein, "Wealth Neutrality and Local Choice in Public Education," American Economic Review, LXV, No. 1, March 1975.

Chapter 5

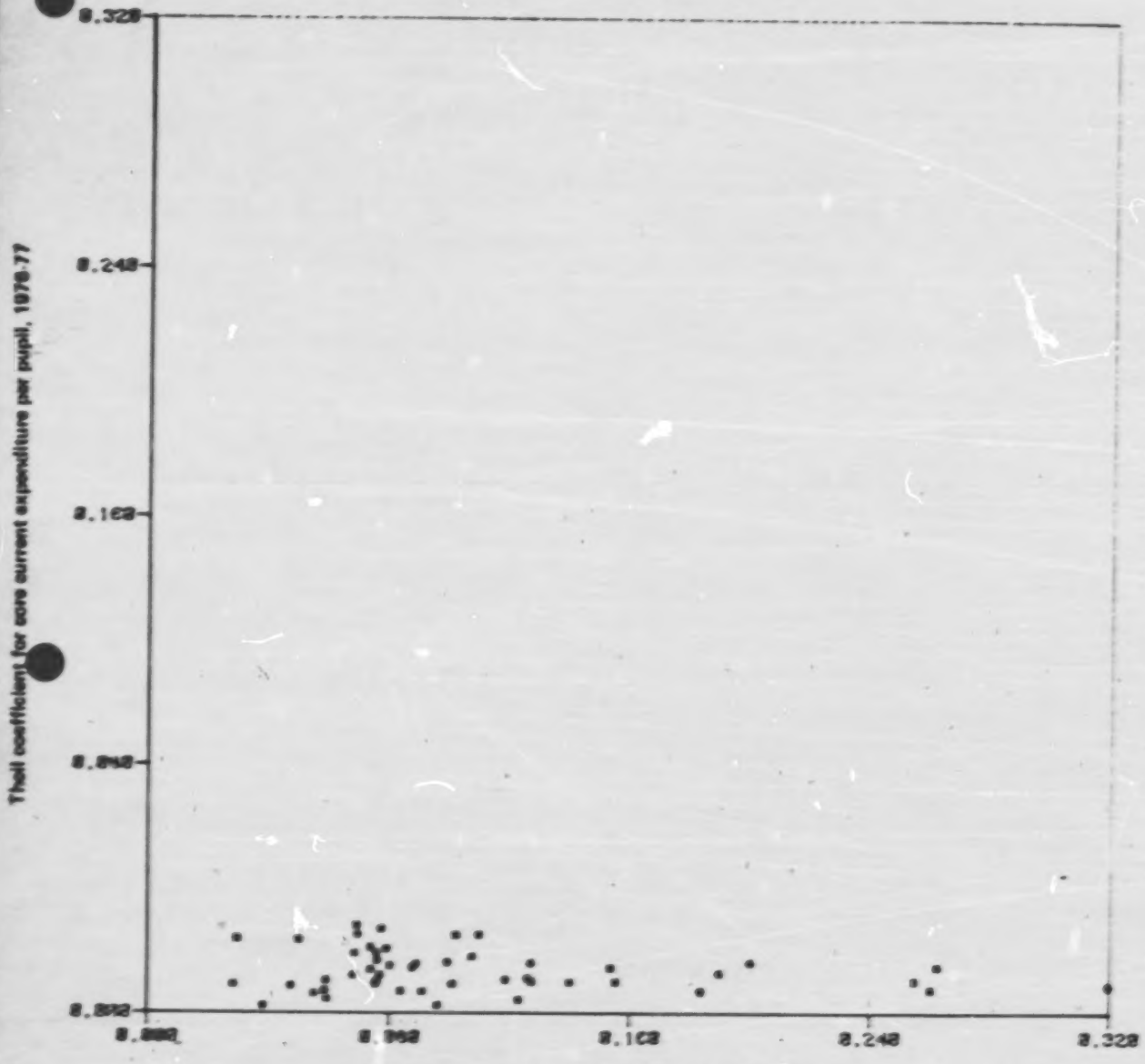
Relationships Between Resource Distributions and Wealth Neutrality

The legislation requiring this report specified that the analysis provide composite profiles of States showing progress toward equalization of resources for elementary and secondary education among the school districts within each State. The previous chapters have indicated the multi-dimensional character of resource distribution and wealth neutrality; comparison of these two related but distinct aspects of equalization requires the inspection of even more complex results. The most important conclusion to be observed from these results is that no single statistical presentation is adequate for purpose of determining degrees of equalization or disequalization; in fact, the statistics are more useful when they are employed to heighten the reader's awareness of the contributions of many factors.

Considerable discussion was devoted to resource distributions in Chapter 3, with core expenditures utilized for the more detailed of the analyses. In considering the various tests for wealth neutrality, property valuation per pupil and computational tax rates were essential variables at the school system level. Both expenditure dispersions and wealth neutrality should be linked to address the policy issues underlying the analysis, which require assessing the magnitude of the task of equalizing resource distribution. Accordingly, several analyses were completed using variables expressing aspects of either expenditure dispersion or wealth neutrality.

Comparisons of the dispersions in core expenditure and in property valuation per pupil among school systems in each State are particularly insightful. Chart 5.1 displays Theil coefficients measuring the dispersion for each State for the two variables. The diagram is striking in its illustration of the fact that dispersion in property value greatly exceeds

Chart 5.1
Theil Coefficients for Core Expenditure and Property Valuation, by State: 1976-77



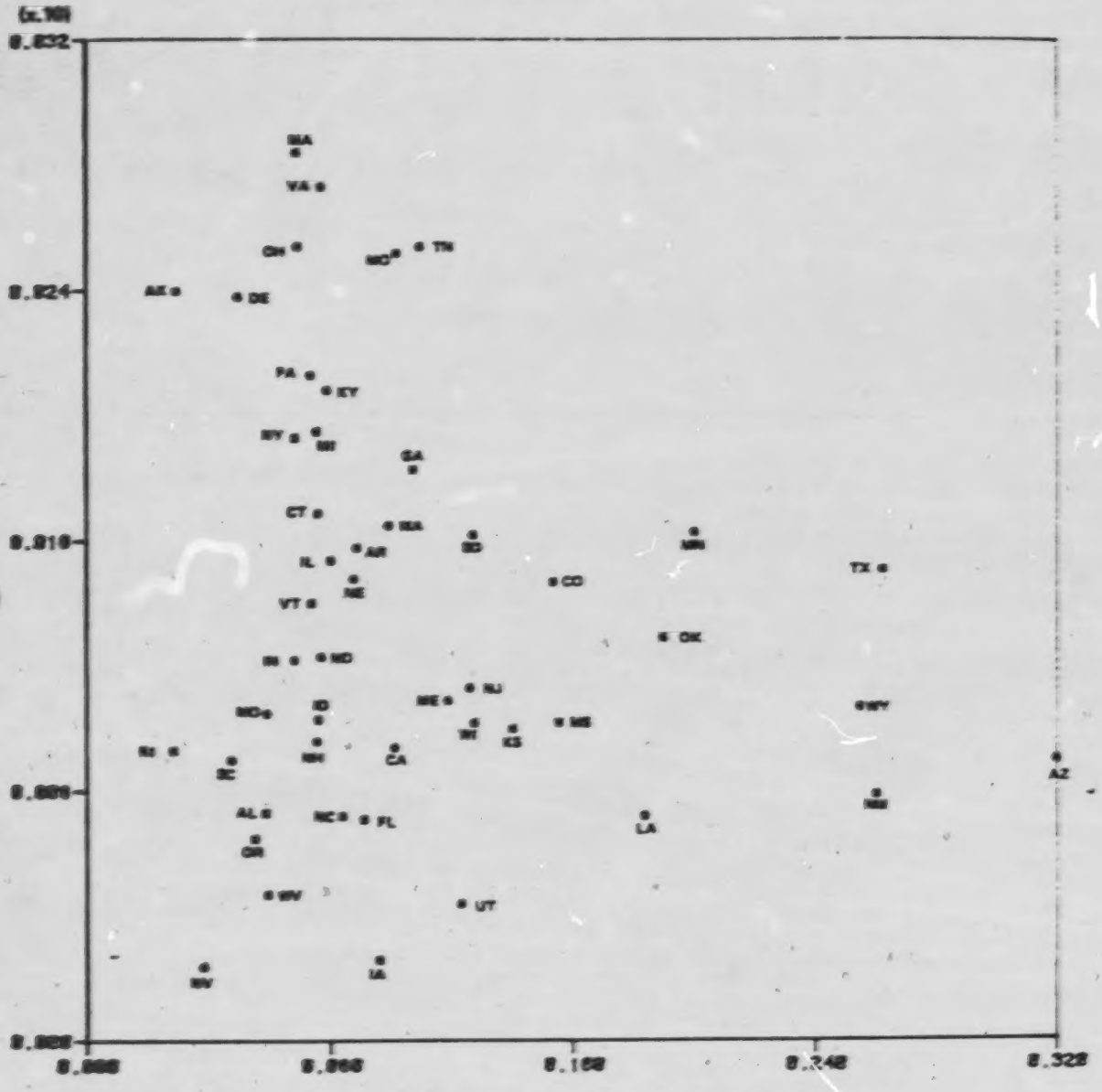
Sources: Tables 3.15 and 4.7

the dispersion in core expenditure. In other words, States generally appear to have systems of school support that yield more equitable distributions than that which would derive solely from the property tax base if every system levied the same tax rate.

The range in dispersions is so different for the two variables that in order to more clearly observe the relationship, the chart has been recast with the core expenditure axis scaled at one-tenth the scale of the axis showing property valuation per pupil. With this expanded presentation (chart 5.2), it is possible to locate individual States. Some cross-State observations can be made. For States with the same expenditure dispersion coefficient but differing property value dispersions, those with the greater property value dispersions can be said to be making the greater effort to reduce expenditure disparities. Only three States — Alaska, Delaware, and Rhode Island — have expenditure disparities greater than 40 percent of property value disparities. A total of 20 States have expenditure disparities less than 10 percent of their property value disparities.

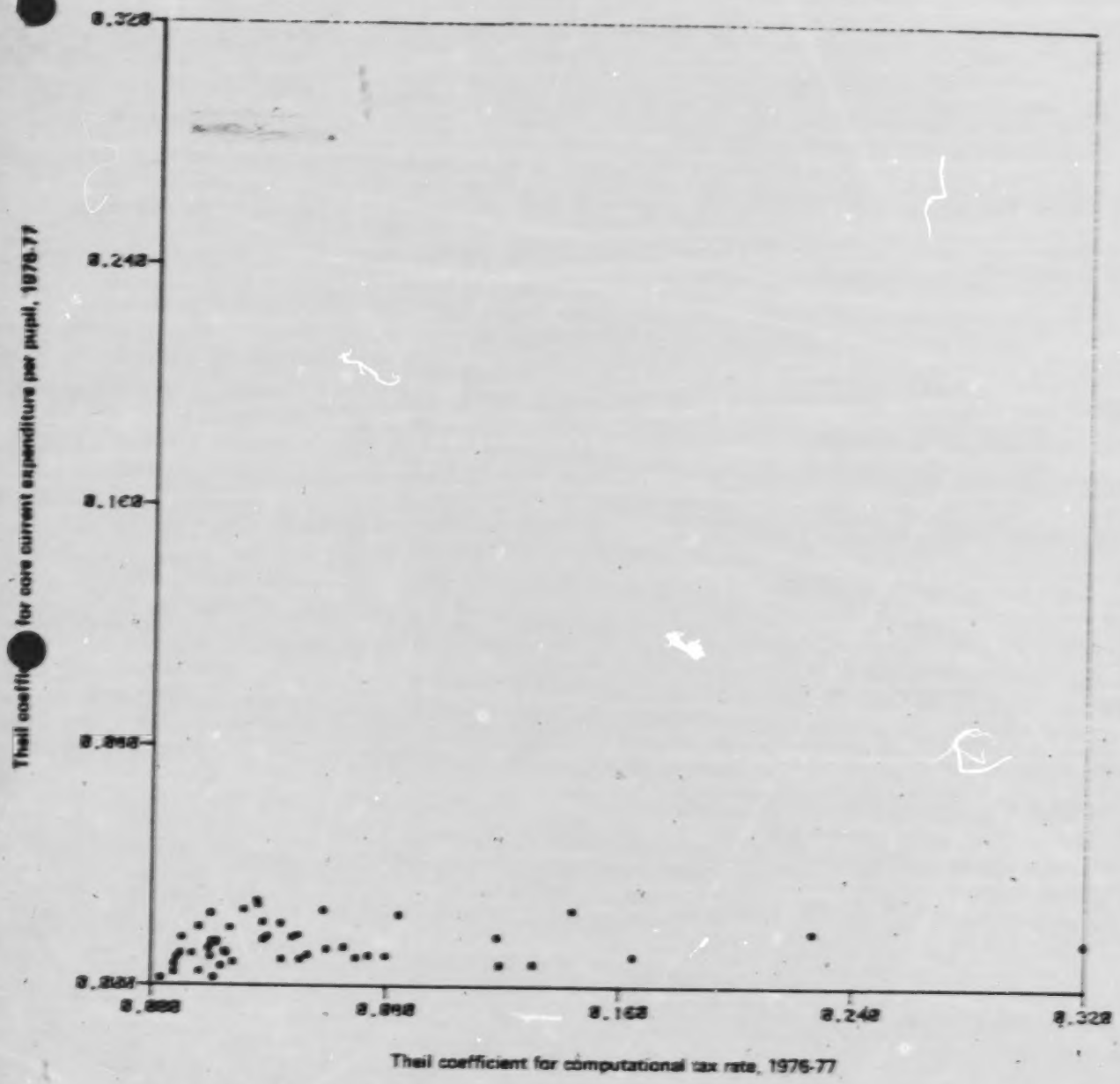
Similar comparisons of dispersions in core expenditures and computational tax rates are also illustrative. It should be recalled from Chapter 4 that the dispersions in computational tax rates were usually less than those for property values. In only 7 States — Alabama, Delaware, Georgia, Indiana, Mississippi, North Carolina, and Washington — did computational tax rate dispersion exceed property value dispersion. Charts 5.3 and 5.4 display Theil coefficients for core expenditures and computational tax rates on equal scales and on scales which show the expenditure dispersion at one tenth computational tax rate dispersion. When these dispersions are compared, six States— Alaska, Arizona, Florida, Maryland, Michigan and Rhode Island — have an expenditure dispersion greater than that for their computational tax rate.

Chart 5.2
Theil Coefficients for Core Expenditure and Property Valuation, by State: 1976-77
(with Magnified Scale for Core Expenditure)



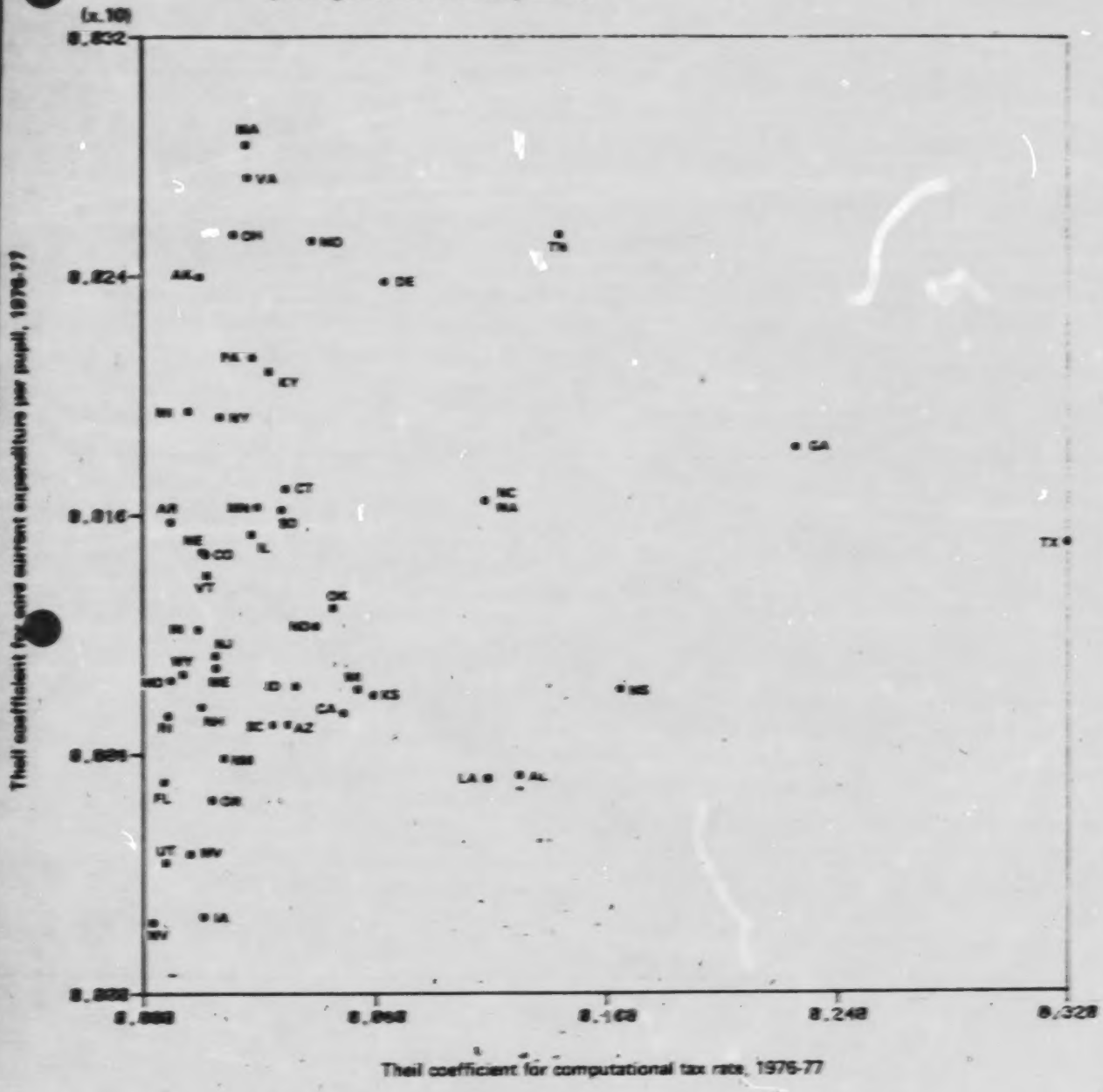
Sources: Tables 3.15 and 4.7

Chart 5.3
Theil Coefficients for Core Expenditure and Computational Tax Rate, by State: 1976-77



Sources: Tables 3.15 and 4.10

Chart 5.4
Theil Coefficients for Core Expenditure and Computational Tax Rate, by State: 1976-77
(with Magnified Scale for Core Expenditure)



Sources: Tables 3.15 and 4.10

Another 19 States have an expenditure dispersion between 50 percent and 100 percent of their computational tax rate dispersion. Thus if a criterion for judging the goodness or badness of expenditure dispersions is that it be less than dispersions of taxable property values or computational tax rates, all the States fall in the acceptable category except the six States for which expenditure dispersion exceeds the computational tax rate dispersion.

Summary

It has already been observed that disparity from equal expenditure or from wealth neutrality cannot be readily captured in a single statistic. In fact, to do so almost certainly oversimplifies the situation for some States to the point of unfairly characterizing patterns of funding. The need for improved wealth data is highlighted throughout the study and will continue to be a nagging problem for future researchers. The detailed statistics shown here as measures of disparity are best used to reflect differences rather than degrees of goodness or badness.

States have reduced expenditure disparity below the disparity of property value, the upper limit for expenditure disparity. Clearly, if resource dispersion is low across States and across school systems within States, disparities from wealth neutrality are less consequential from the point of view of the pupil receiving educational services. However, expenditure dispersion, and hence probably expenditure disparity, continues. The generally lower dispersion in teachers per 1,000 pupils indicates that a large part of the expenditure variation may be caused either by cost differences or student need differences. Neither the variation in costs or student needs is easily addressed analytically among States nor within States among school systems. In addition, within school system differences in costs and teachers

undoubtedly exist and are not easily considered. Nonetheless, the results shown in this and the preceding two chapters suggest that a useful focus for further analysis of resource disparity would be resources in terms of teachers and services provided to pupils and the dispersions among them.

Chapter 6

Measuring Disparities

The legislation requiring the National Center to compile statistical profiles of the financing of public elementary and secondary education also directed the Center to apply such measures as it considered appropriate to the task of assessing disparities in expenditures and disparities from wealth neutrality. Hence considerable attention was directed to the review and evaluation of comprehensive measures.

The assignment to review measures of expenditure disparities and of wealth neutrality posed two distinct tasks. Considerable attention has been devoted to the study of the unequalness of distributions by economists, statisticians and others over the last 100 years. Hence a considerable body of literature offers a rigorous examination of theoretical and statistical properties of distributions. The investigations reported in the literature have proven useful in the present study. A far different situation characterizes the measurement of wealth neutrality. Not only is there no comprehensive, on-going literature reflecting the development and refinement of measures, but even the definition of wealth neutrality is not definitive at this time. In fact, explicit statistical tests of wealth neutrality now in use derive from different formulations of the concept.

Given the differences in the status of development for measures applicable to the two aspects of the study, the discussion of the measures and their properties has been handled differently in this report for the two areas. Because the statistical tests proposed as criteria for wealth neutrality are both relatively standard and closely derivative of the particular definitions being applied,

the discussion of statistical properties of wealth neutrality measures is included in the chapter on substantive issues and analytical results. In contrast, many of the theoretical discussions related to distributions of inequality are important to the rationale and interpretation of the analytical approach employed. Thus some of these discussions are repeated here.

Criteria for Measures of Inequality

A criterion for the measurement of inequality requires some ordering of distributions of a resource over recipients. At one extreme, distributing an equal share of a resource to each recipient would yield equality while having the total amount of the resource possessed by a single recipient would represent the most extreme case of inequality. Investigations of statistics to measure inequality have studied how measures compare distributions between these extremes.

Several commonly discussed mathematical (statistical) properties of measures of inequality were considered important to the present study. In some cases, these criteria represent a particular value judgment with regard to the issues being addressed. The discussion of measures chosen or eliminated presents the rationale for making these judgments.

1. The measure should be scale invariant, that is, the value attached to the measurement of inequality should not be affected by units in which the distribution is measured.

2. The measure should conform to the principle of transfers, that is, the measurement of inequality should decrease whenever a resource is transferred from a more affluent to a less affluent recipient, regardless of the amount transferred and regardless of the degree of affluence of the two recipients.

3. The measure of inequality should permit decomposing inequality between and within classifications of recipients.

4. At the very least, the measure of inequality should equal zero when all school systems have the same resources per pupil (e.g., core expenditure) and should have a positive value when two or more school systems differ.

5. Grouping of recipients into different classes defined by such means as percentages of the distributions, equal dollar intervals if resources are expressed in money terms, or by State or by school system should have known effects on the measure of inequality.

6. The measure of inequality should test distributions against the standard of providing equal shares of resources per recipient, implying the adoption of measures around the mean as the standard, rather than some other measure of central tendency such as the median.

7. Each observation should contribute to the statistic calculated.

8. The summary statistic of inequality should not require a subjective judgment of value from which inequality is measured.

9. The measure of inequality should have common sense appeal to readers not familiar with mathematical properties.

10. The measure of inequality utilized should permit comparison with previous studies of inequality.

Applying these criteria to available statistical measures of inequality resulted in choosing the measures used. The criterion of scale invariance led to the choice of a group of measures such as the coefficient of variation rather than the group of measures such as the standard deviation. The coefficient of variation is the standard deviation divided by the mean of the distribution. Measures of the spread of the distribution can be made scale invariant by dividing them by the related measure of central tendency; dividing the standard deviation

by the mean.

Other aspects of scale invariant measures made this criterion particularly important. The scale invariance property permits comparisons over time, over geographic places, over different resources such as expenditures and property valuation, and over resources expressed in different denominations such as dollars and physical counts of teachers. Scale invariance also permits the multiplication of each recipient's share by a constant with no resulting change in the value of the inequality measured. Scale invariant measures do decline in value when a positive constant is added to each recipient's share. Thus comparing a State's distribution of expenditures per pupil for one year with those for another year in which expenditures per pupil increased by 10 percent because of inflation would give the same measure of inequality. However, if a State's distribution of expenditure per pupil for one year were increased in another year by $100 per pupil, the change would result in a decline in inequality. Stated differently, a change in numerical mean value for a given distribution resulting from a change in scales will not change its measured inequality; however, a distribution with higher mean value than another yet having the same standard deviation or range will have lower measured inequality. If distributions have equal dispersion their inequality can be ordered by the mean values of the distributions.

Many potential measures are not scale invariant, and were ruled out. Measures unsatisfactory on this basis included:

a. Range. Difference between highest and lowest observation.

b. Interquartile range. [P(75) - P(25)], where P(75) and P(25) are the 75th and 25th percentiles, and all other restricted ranges.

These two measures also violated the criterion that each observation should contribute to the statistic calculated.

c. Variance. Mean squared deviation of observations from the mean.

Application of the principle of transfers eliminates a number of other possible measures, including:

d. Range ratio. P(95) - P(5) /P(5) and all similar measures involving ratios of a restricted range to an arbitrarily chosen percentile. While often used because this measure is cited in legislation, the measure is of limited value when considered in the light of the criteria. The measure is completely insensitive to all transfers between the 5th and 95th percentiles, below the 5th percentile, and above the 95th percentile. Suppose, for example, that transfers were made such that the 88 percent of students between the 5th and 95th percentiles would share their total resources equally so that all would have identical per pupil expenditure. The value of the range ratio would be unaffected by this tremendous surge toward equality.

e. Relative mean deviation. Mean absolute deviation from the mean. Transfers that do not cross the mean are not reflected in this measure. Thus the richer school systems could pool their money and have transfers among themselves so that the per pupil expenditure was the same in each system, and the poorer districts could do likewise; and the relative mean deviation would not be reduced at all despite the enormous movements toward equality.

f. Standard deviation or variance of the logarithms of the observation. This measure responds well to transfers at lower expenditure levels. But at high expenditure levels (greater than 2.718 times the geometric mean), the variance of logarithms actually decreases with a transfer from a (relatively) poorer to a richer system.1/ Although this is a serious limitation, the variance of logarithms does have very desirable inferential properties.

Several other measures were also considered and rejected, usually because they require the application of subjective judgments. For example, measures that indicate the resources needed to provide all recipients with a specified

minimum standard were excluded. The McLoone Index is one such measure. The index is

$$\sum_{i=1}^{J} (P_i X_i) / (M_p \sum_{i=1}^{J} P_i)$$

where: M_p = median expenditure per pupil
P_i = pupils in ith system
X_i = expenditure per pupil in ith system

Districts 1 to J are below M_p, the median expenditure per pupil. These measures also represent a philosophical approach distinct from that adopted in this study, which considers how far distributions are from providing equal shares to recipients.

Primary Measures Applied in the Study

Of the measures mentioned above, the range and the range ratio are used to define the context for distributions examined in the study, and hence are shown in many instances. However, the analysis of dispersions rests on three measures which satisfy most of the enumerated criteria: the Coefficient of variation; the Gini coefficient; and the Theil coefficient. Definitions and properties of these three measures should be explored.

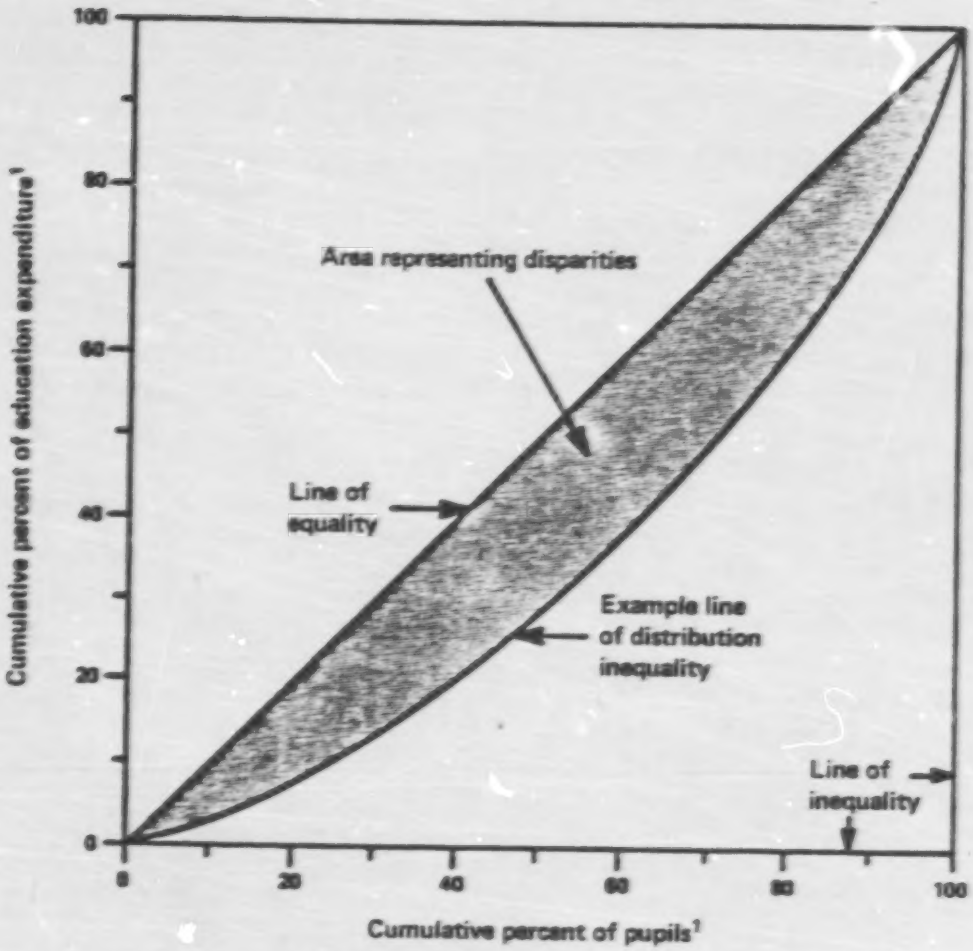
a. Coefficient of variation. This measure of dispersion is most easily described in relation to a normal distribution. If a factor being considered (for example, school system expenditure per pupil) has a normal or approximately normal distribution, then about 68 percent of the units (school systems, in this example) will lie within one standard deviation of the mean of the distribution and about 95 percent will lie within two standard deviations of the mean. The coefficient of variation is merely the standard deviation presented as a proportion of the mean (That is, the coefficient of variation is equal to the standard deviation divided by the mean): 2/

$$V = \frac{\sigma}{\mu}$$

Clearly, the higher the coefficient of variation (V) is, the greater is the spread or dispersion of the distribution. In the special case of a finite distribution for which the units are all greater than or equal to zero, the coefficient of variation can range from zero to $\sqrt{n-1}$, which is reached when one individual (system) has everything and the others nothing. V is equally sensitive to transfers among systems at all resource levels. Thus a transfer of $100 per pupil from a $600 per pupil expenditure system to a $400 per pupil expenditure system has the same impact as a transfer of $100 per pupil from a $1,600 system to a $1,400 system. V is sensitive to extreme values of a distribution and takes no account of the skewness of a distribution. This factor is important as it will be seen later that shape is an important characteristic of distributions considered here, expenditures per pupil and property valuations per pupil.

b. Gini coefficient. This measure describes the joint cumulative distribution of a resource and its recipients. Thus it is particularly attractive for comparing the distribution of educational resources across students or school systems. The coefficient is most easily expressed in terms of a graphic representation. If all entities in a distribution are ranked, from lowest to highest, it is possible to calculate for each rank of the population the proportion of of the population at that rank or below and also the proportion of the total amount of the good being distributed that is earned by entities at that rank or below. If the relationship between these two proportions is plotted for every rank, the resulting graph is called the Lorenz curve (chart 6.1). Described geometrically, the Gini coefficient is the ratio of the area between the Lorenz curve and the line of equality (the shaded area in chart 6.1) to the triangular area formed by the line of equality, the horizontal axis, and the line parallel to the vertical axis at the 100 percent point of the cumulative pupil scale.

Chart 6.1
A Lorenz Curve: An Illustration of Disparities in Education Expenditures



[1] Ranked from low to high by expenditure per pupil

Expressed mathematically, the measure is the average difference in resources between any two pairs of school systems relative to the average for all systems. It is a measure of dispersion divided by the mean:

$$G = \frac{\frac{1}{2}\frac{1}{N^2}\sum_{i=1}^{N}\sum_{j=1}^{N}|X_i - X_j|}{\mu}$$

The Gini coefficient (G) has a range from 0 to 1, though with most types of distributions the values tend to be concentrated in a small portion of the full range. The Gini coefficient is not sensitive to some changes in the shape of the Lorenz curve. For example, two distributions with equal Gini coefficients may have Lorenz curves that cross, meaning that they differed in equity at different portions of the distribution.

The Gini coefficient cannot be decomposed and thus does not possess one of the desirable characteristics mentioned earlier. Furthermore, although it is currently a popular measure of inequality, the Gini coefficient has another limitation. For a typically shaped distribution it tends to be more sensitive to transfers around the middle of the distribution and less sensitive to equal transfers among the very poor or the very rich. Thus, if the distribution of system per pupil expenditure is unimodal with a median of about $1,500, a transfer of $100 per pupil from a $1,600 system to a $1,400 system has more of an effect of the Gini coefficient than does a $100 transfer from a $600 system to a $400 system.

c. Theil coefficient. The Theil coefficient is a measure of dispersion adapted from information theory. For the single event E with probability p, we receive a message (data) that the probability of E occurring has changed to q. We call p the prior probability and q the posterior probability. The prior probability p has information content $t(p)=\log 1/p$ and the posterior probability

q has information content $t(q) = \log 1/q$. Therefore, the message that transferred p to q has information content: $T(p:q) = t(p) - t(q) = \log q/p$

For N events: $$T(p_i:q_i) = \sum_{i=1}^{N} \log q_i/p_i$$

Where event X_i is an educational resource (for example core current expenditure) received by the ith individual in a population of N and μ is the mean:

$$\mu = \frac{\sum_{i=1}^{N} X_i}{N}$$

the prior probability of the core current expenditure received by an individual is

$p = \frac{\mu}{N\mu} = \frac{1}{N}$ and the posterior probability is $q = \frac{X_i}{N\mu}$

Then:

$$T = \sum_{i=1}^{N} X_i/N\mu \log [(X_i/N\mu)/(1/N)]$$

$$T = 1/N \sum_{i=1}^{N} X_i/\mu \log (X_i/\mu)$$

which reduces to a more computationally convenient formula and reveals that the Theil coefficient (T) is a measure of dispersion divided by the mean:

$$T = \frac{1/N \sum_{i=1}^{N} X_i \log X_i - \mu \log \mu}{\mu}$$

When $X_i = 0$, $X_i \log X_i$ is also defined to be 0. Theil's measure has a lower bound of 0 and an upper bound of natural log n, which is reduced when one individual has everything and everyone else has nothing. Merely increasing or decreasing the number of pupils or school systems will not change the value unless such a change affects the distribution of resources.

While the coefficient of variation, as noted above, is equally sensitive to transfers at all income levels, the change in T depends on the ratio of the affected per pupil expenditures. The lower the level of expenditure, the more sensitive T is to an equal dollar transfer.

The Theil coefficient can be decomposed to show the inequality of a distribution among groups and inequality within groups. For example, it is possible to decompose the measured inequality in per pupil expenditures over the nation into inequality among States and inequality within States. For each state we know $\bar{X}j$, the mean per pupil expenditure of the jth state, the proportion of students, Pj, in State j, and Tj the inequality measure for each State.

The decomposition of Theil's index is

$$T = \sum_{i=1}^{J} (P_j\bar{X}_j/\bar{X}) \log (\bar{X}_j/\bar{X}) + \sum_{i=1}^{J} (P_j\bar{X}_j/\bar{X})T_j \qquad \text{where}$$

$\bar{X} = \sum_{j=1}^{J} P_jX_j / \sum_{j=1}^{J} P_j$ is the grand (national) per pupil expenditure. The first term on the right-hand side is the among States component. It is equivalent to the value of T that would be obtained if everyone in each State received the mean expenditure for that State. The second term on the right-hand side is a weighted average of the within-group T values.

Relationships Among the Measures of Inequality

The three measures discussed above--the coefficient of variation, the Gini coefficient, and the Theil coefficient--are preferable among those available for application in this study. While the measures are distinct, it should be noted that all are measures around the mean. Each tests a distribution

against the implicit standard of equal shares of resources for each recipient. The measures give different emphases to different aspects of the distributions. Because more general characteristics of the distributions do interact with the various measures, some observations regarding the distributions being examined here are necessary.

While much of statistical theory is built around examinations of the normal distribution, this is not appropriate for a consideration of distributions portraying inequality. The theoretical normal distribution is symmetrical and ranges from minus infinity to plus infinity. In contrast, measures of inequality are usually used only for variables which are nonnegative, and the distributions are often positively skewed. Core current expenditure per pupil for unified school systems was observed to have this distribution (chapter 3, chart 3.3). The lognormal distribution has both these characteristics, and may be used for alternative expressions of the measures considered here. The coefficient of variation, the Theil and Gini coefficients are all from the same family of curves, related to the variance of the lognormal distribution. 3/

The theoretical ranges of the three measures have been identified. In application, however, the statistics describing types of distributions tend to fall within particular ranges. Income distributions, for example, tend to have Gini coefficients between 30 and 45. Distributions of core current expenditure for school systems within States, by comparison, yielded Gini coefficients with much smaller values, being less than 15 for all States. Theil coefficients for this variable, when multiplied by 1000, ranged from almost zero to about 25, while the coefficient of variation varied from 7 to just under 25.

Very different values were obtained for the statistics describing dispersions of taxable property value for school systems within States. While each of

the three measures yielded higher calculated values on dispersions of this variable, the increases were much greater in the case of the Theil coefficient, which is constrained only by the value of n. Thus the values for the Gini coefficient ranged between 10 and 35, the coefficient of variation from 20 to 90, and the Theil coefficient from 30 to over 250. The differences in the statistics for these two variables suggest that an important aid to the interpretation of particular calculated values is a knowledge of the range of values resulting from applications of the measure to the type of distribution being studied. This information should be considered in addition to the mathematical constraints on values.

An understanding of the lognormal characteristic of the distribution is useful in interpreting one of the major differences between the Theil coefficient and the Gini coefficient. In examining the distribution of educational resources, changes in the lower portion of the distribution are of greater concern than changes in the "upper tail" of the distribution. Because its sensitivity to transfers decreases as values increase, the Theil coefficient is especially desirable for measuring inequality of educational resources, or other social rewards having diminishing marginal utility. It was noted that two Lorenz curves describing distributions could cross and yet have the same Gini coefficient. This would not occur with the Theil coefficient, which would be less for the distribution that was more even at lower values. For variables like age, where utility is neither strictly increasing nor especially relevant, the flat sensitivity of the coefficient of variation would make it the appropriate choice. The fact that it is also easily obtained makes it particularly useful for exploratory work.

There are several reasons for choosing to show the three measures of dispersion discussed here, despite the differences among them. Both the coefficient

of variation and the Gini coefficient have been used extensively in earlier studies. Applying those measures to the data assembled here permits comparisons of results of this with results of other studies. Furthermore, because those measures are known, they facilitate understanding and interpretation of the results of analyses of the two data bases under a variety of circumstances (e.g., unweighted and weighted data).

To the extent that familiarity of measures is itself a criterion for their use, the applications of the coefficient of variation and the Gini coefficient are again justified. Presenting these results in parallel with those obtained using the Theil coefficient hopefully assists in introducing this relatively new and more complex, and in some respects superior, measure.

The three measures were used to describe characteristics of distributions of educational resources (both expenditures and teachers) and of key variables contributing to wealth neutrality (taxable property values and local school computational tax rate). To supplement the discussion of the mathematical relationships among the measures, comparisons of the values obtained from their application are also useful. In addition to the three statistical measures already described, the ratio of the 95th to 5th percentile was also included in this comparison.

Values of the measures for within-State distributions of school system core expenditure per pupil were correlated, resulting in the matrix shown in Table 6.1. The measures were for the most part highly correlated with one another except for the percentile ratio P95/P05. The Theil coefficient has the highest linear association with the other measures.

Visual comparisons of some of the possible combinations of measures offer additional information. Charts 6.2 through 6.7 illustrate State values for four of the pairs of measures. It can be seen that the relationship between

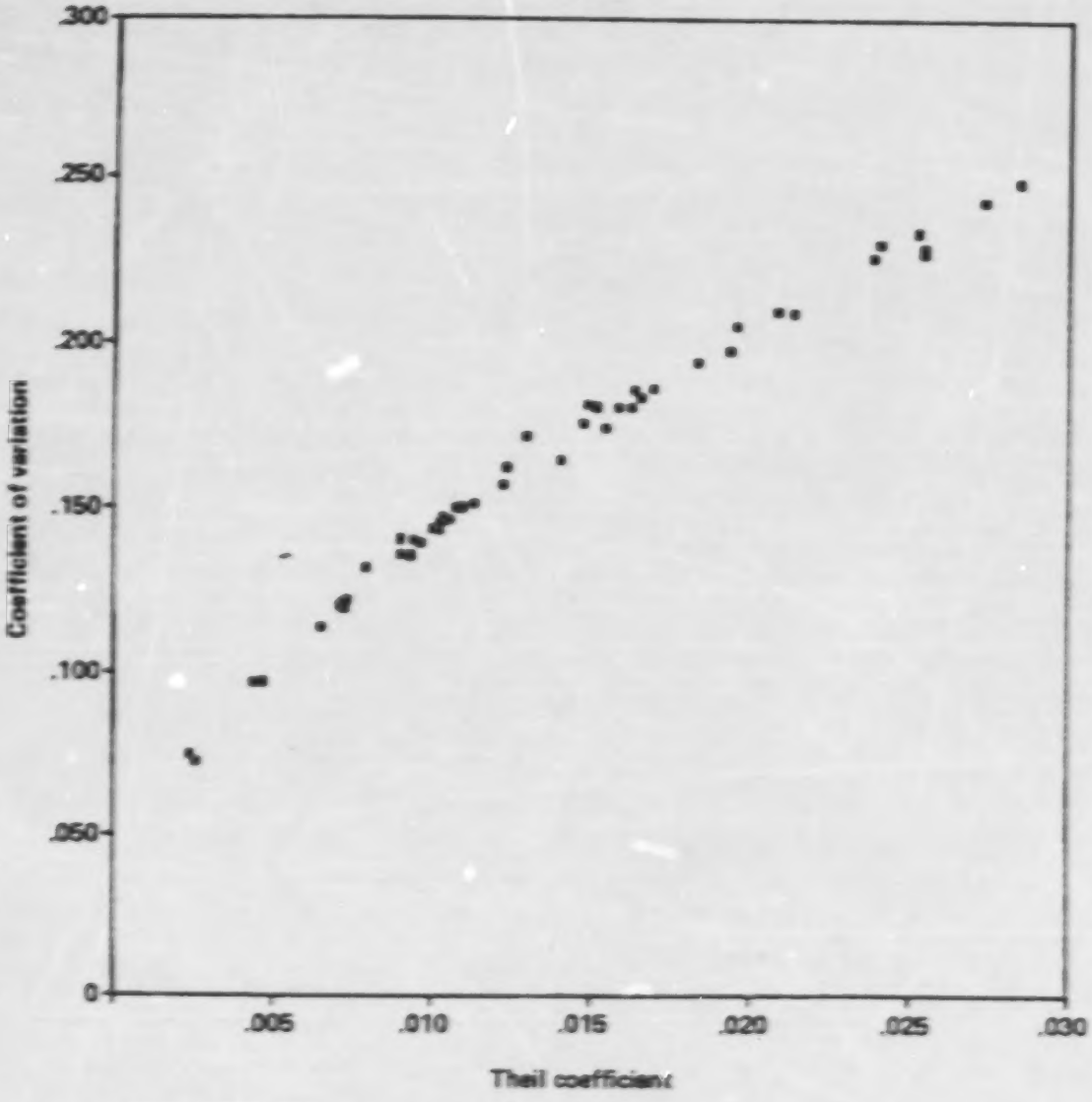
the Theil coefficient and the other measures is nonlinear. The less systematic relationship between the percentile ratio and the Theil coefficient is also evident from these graphs.

Table 6.1
Correlations of values of inequality measures used to describe core expenditure dispersions, by State: 1976-77

	T	CV	G	P95/P05
T	1.000	.989	.962	.904
CV	.989	1.000	.969	.913
G	.962	.969	1.000	.918
P95/P05	.904	.913	.918	1.000

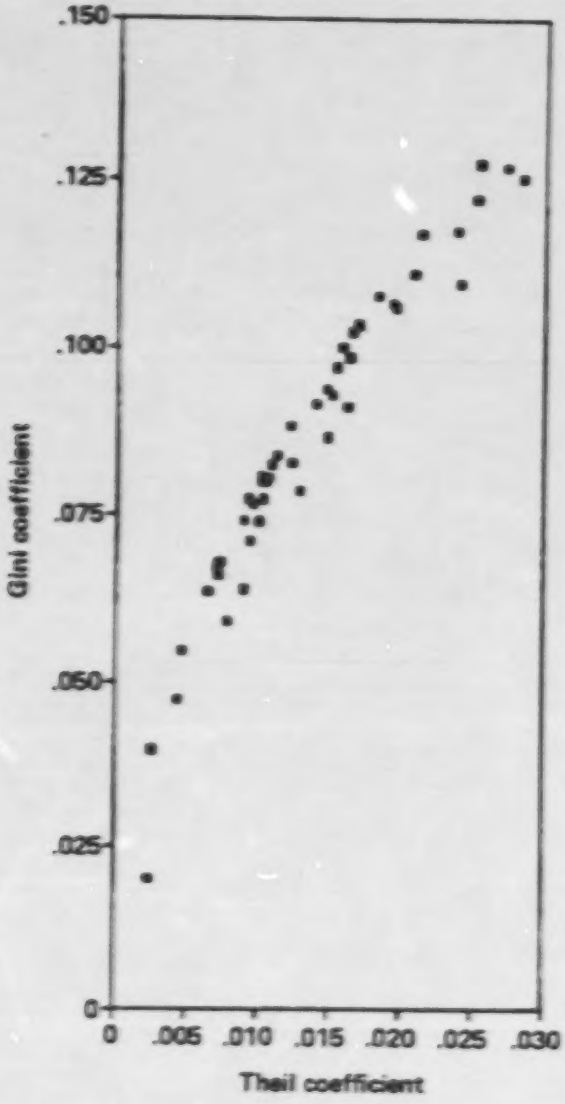
N = 49
SOURCE: Table 3.18.

Chart 6.2
Theil Coefficient and Coefficient of Variation for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



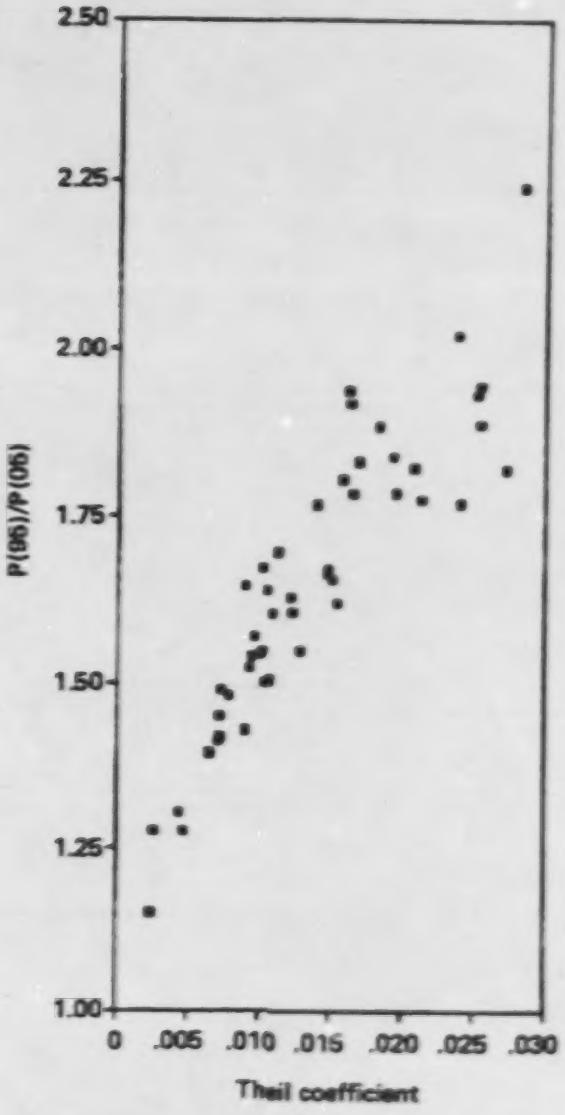
Source: Table 3.18

Chart 6.3
Theil Coefficient and Gini Coefficient for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



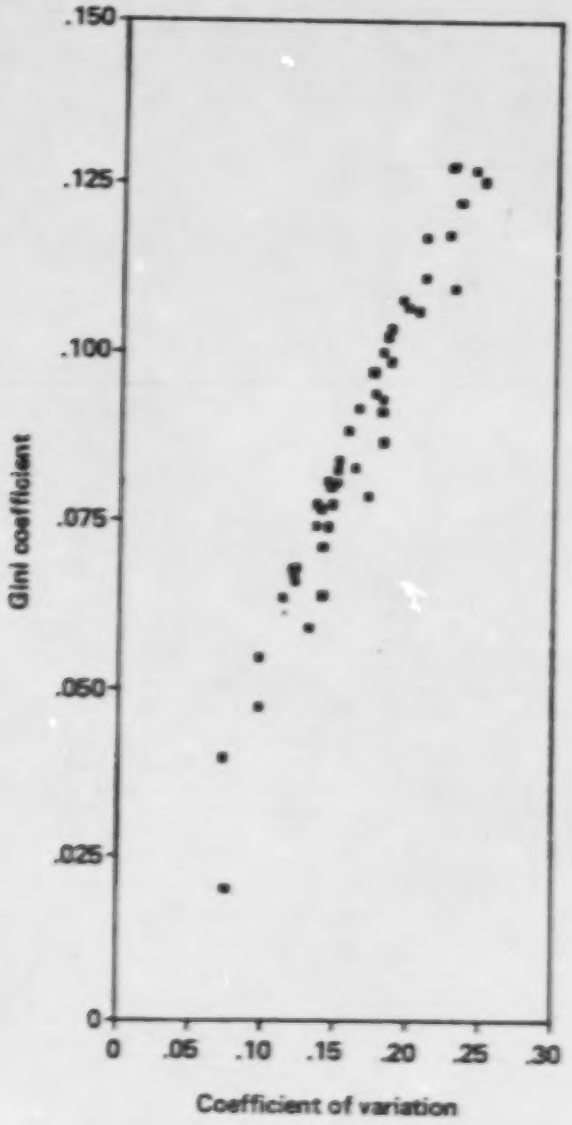
Source: Table 3.18

Chart 6.4
Theil Coefficient and Ratio of 95th to 5th Percentile for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



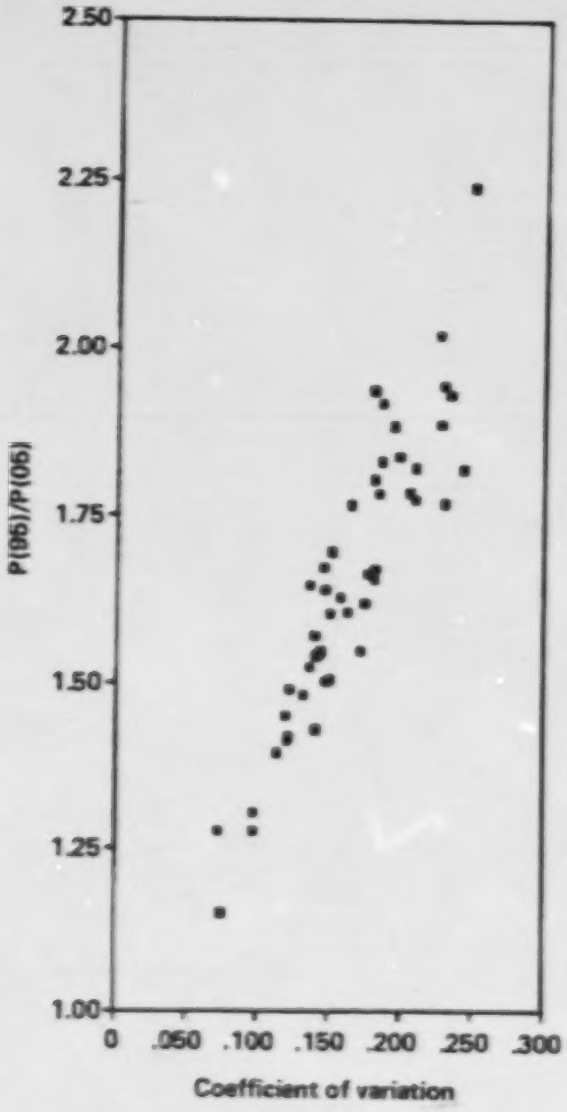
Source: Table 3.18

Chart 6.5
Coefficient of Variation and Gini Coefficient for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



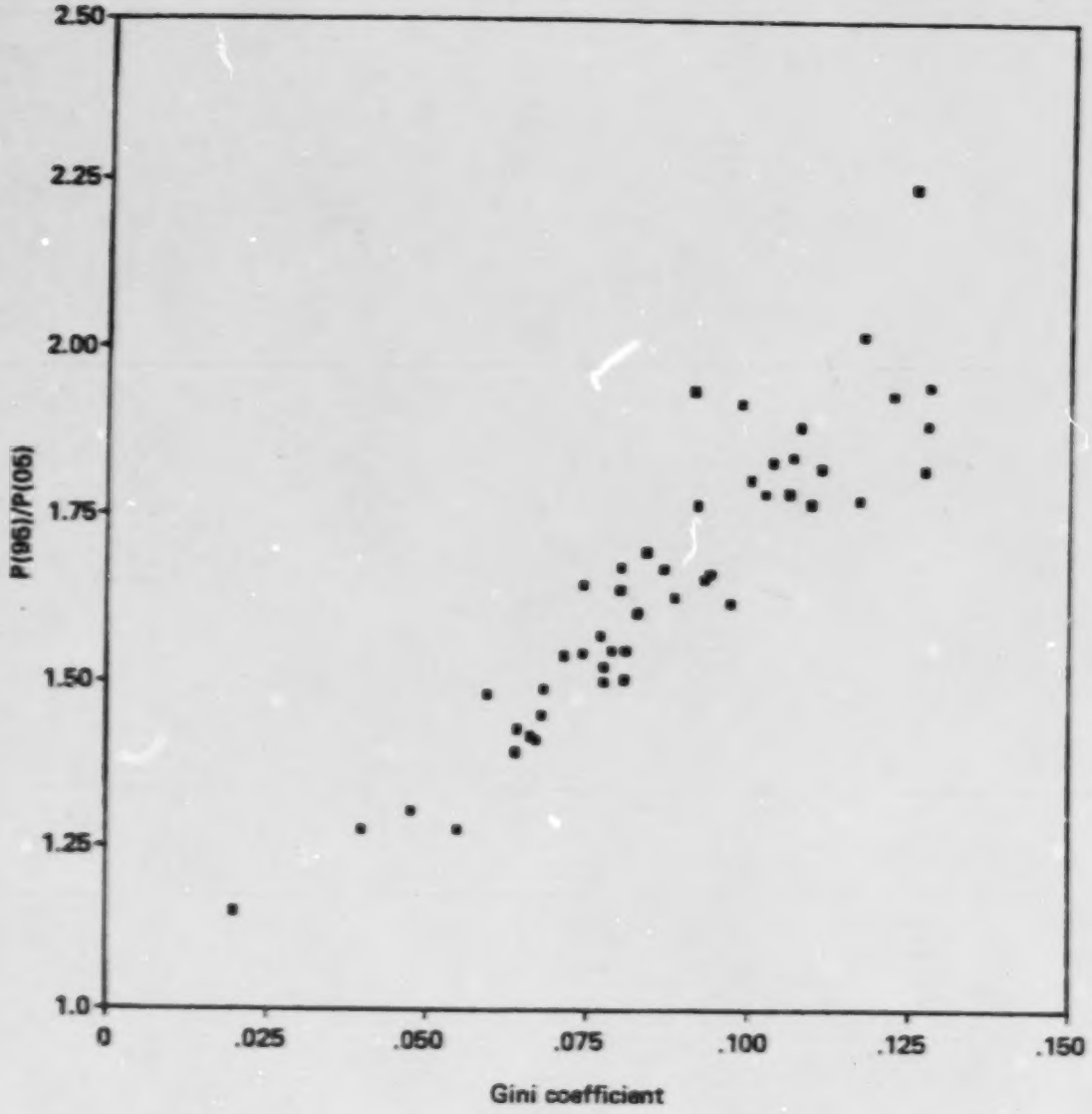
Source: Table 3.18

Chart 6.6
Coefficient of Variation and Ratio of 95th to 5th Percentile for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



Source: Table 3.18

Chart 6.7
Gini Coefficient and Ratio of 95th to 5th Percentile for Within-State Dispersion in Core Current Expenditure Per Pupil, by State: 1976-77



Source: Table 3.18

Chapter 6

Footnotes

1/It has been argued that the extent to which the variance of logarithms violates the principle of transfers is very minor for most empirical distributions.

2/The mathematical formulations for these measures vary slightly depending upon whether the statistics are being calculated for weighted or unweighted distributions. Generalized formulations are shown here.

3/The lognormal distribution can be defined as follows. Consider two random variables X and Y, where Y = log X. If Y is normally distributed with mean R and variance L, then X is said to have a lognormal distribution with parameters R and L. For the lognormal distribution, most of the inequality measures defined earlier can be expressed as increasing functions of L:

$$T = L/2$$

$$V = \sqrt{(e^{L} - 1)}$$

$$G = 2\Phi(\sqrt{L/2}) - 1$$

where $\Phi(\cdot)$ is the cumulative distribution function for a standard normal variable. For more complete discussions of these properties and of the measures used in this analysis, see Paul D. Allison, "Measures of Inequality," American Sociological Review (43), December 1978, pp. 865-880.

Chapter 7

Data Used in the Analysis

The identification, selection and preparation of data to address the concerns motivating this study were integral steps in the analysis. The data were obtained from several sources. The decision to prepare this first biennial report using only data already available meant that a major task of this project was the design, construction and editing of comprehensive data files to support the analysis. This chapter introduces the data files and highlights the essential aspects of the procedures used to obtain them.

The limitations imposed by data availability are highlighted as they affect the analysis. While considerable effort was devoted to assembling data files using identical school system designations, comparable definitions and verified data, the degree to which this objective was realized varied widely for the different types of data used. Consequently, some parts of the analysis are based on reliable and comparable data whereas others use data with less integrity.

Two composite data bases were assembled for the present analysis: the State data base and the school system data base. In addition to describing each one, this chapter will discuss differences between the two. More detailed description of the data is provided in the documentation for the public use computer tape 1/ and in data validation reports describing the editing procedures in detail. A prime requirement for data used was that comparable data be available at both State and school system levels of aggregation. In some cases, data are included in the two data bases that are not used in the reported analyses. In these instances, editing procedures identified sufficient inconsistencies across States that cross State comparisons were not feasible. Data were retained in the data bases because they could contribute to detailed within-State analyses.

MERGED STATE DATA BASE

The merged State data base contains data aggregated at the State level for the 50 States, the District of Columbia, and Puerto Rico for three school years: 1969-70, 1973-74 and 1976-77. The data base includes information on school, population, and economic characteristics:

fall enrollment
current expenditures, by category
total expenditures
capital outlay and interest
revenues, by source
numbers of classroom teachers
average salaries of teachers
personal income (for 1976)
population data (for 1976)
taxes collected per capita and various tax indexes (for 1976)

Data Sources

More specifically, the following published data were used by categories:

fall enrollment:	National Center for Education Statistics, Statistics of Public Schools, Fall 1970, Statistics of Public Elementary and Secondary Day Schools, Fall 1974 and 1977-78 School Year
expenditure and revenue data:	National Center for Education Statistics Statistics of State School Systems, 1970, Revenues and Expenditures for Public Elementary and Secondary Education, 1973-74 and 1976-77
taxes collected per capita and various tax indexes	National Institute of Education, Tax Wealth in Fifty States

Unpublished data were also used:

Children with special needs:
U.S. Department of Health, Education, and Welfare, Survey of Income and Education (SIE), 1976

The data used in the State level analyses were for the most part unchanged from the published sources, which contain notes as to their quality. The use of fall enrollment rather than average daily membership or average daily attendance as a pupil measure was adopted because it was the only count available at both a State and a school system level for 1976-77. The data base providing information on children with special needs was adjusted especially for use in this analysis to provide unduplicated counts.

The two expenditure measures included the following items:

Core current education expenditures Includes current expenditures for instruction, administration, fixed charges, maintenance and operation, and attendance and health services.

Total education expenditures Includes core current expenditures, plus current expenditures for pupil transportation, net expenditures for food services and student body activities, and expenditures for summer school and community services as well as capital outlay and interest on borrowed funds.

Expenditure figures from the State data base were corrected to investigate possible cost of living differences as a factor contributing to expenditure dispersions. The adjustment used here was developed by the National Center for Economic Alternatives to modify income differences across States to account for living costs. 2/ The adjustment incorporated proportions of metropolitan and nonmetropolitan population in each State and proportions of families of varying income levels within each region of a State. Because the adjustment focused on family living cost differentials, which may differ proportionately from commodities purchased by educational institutions, the adjustment was applied as illustrative only.

In addition to being used in the State level analyses, the State totals on these variables provided one basis for checking data reported by school systems.

MERGED SCHOOL SYSTEM DATA BASE

The merged school system data base contains data at the system level for 49 States (Montana is excluded) and the District of Columbia for the school years 1969-70 and 1976-77. Data from five federal sources were used in the analyses reported here. Topics covered closely parallel those included in the State level base.

Data Sources

The following federal data files were merged to conduct the school system level analysis:

school system identification, attendance	National Center for Education Statistics (NCES) ELSEGIS School District Universe 1969-70, 1973-74, 1976-77
expenditures	National Center for Education Statistics (NCES) ELSEGIS III - B 1969-70
staff	National Center for Education Statistics (NCES) ELSEGIS II-A Fall 1969
pupils, expenditure, property valuations	Bureau of the Census, F-33 Survey of Local Government Finances, 1976-77
equalized property value	Killalea Associates, Inc., Data on Local Property Wealth for School Year 1976-77 (J. N. Killalea, KAI Arlington, Virginia)

classroom teachers	Equal Employment Opportunity Commission, EEO-5-Elementary-Secondary Staff Information Fall 1976
children from families below the poverty level	National Institute of Education, Special Tabulations of 1970 Census Data by School District, 1970 Census, 1973-74 school district boundaries.
children of Hispanic Origin and minority children	Office for Civil Rights, OCR-Elementary and Secondary School Civil Rights Survey, Fall 1976

Data Editing

Assembling these data bases from several sources into a single, merged file required resolution of several types of problems. First, a definitive file of school systems for each State had to be established. Second, the data bases were not identical in coverage, so that it was necessary to either impute missing values or eliminate certain systems from the analysis. The problems of data availability occured unevenly across States. Third, a variety of specific problems were identified in checking reported data on particular variables. Editing removed many of the problems, but certain weakness and limitations do remain either in analyses on certain variables or in the results reported for some States. Thus the characteristics of the data base on a given subject must be considered a source of essential background information and qualifers regarding the confidence with which a reader accepts the conclusions.

In extreme cases, data availability or data quality eliminated the possibility of any analyses related to some subjects of interest. Data on personnel at the district level comparable to State totals were available only for classroom teachers. Hence no analyses involving other categories of support personnel were possible, even though such analyses might have offered interesting insights into the flexibility of alternative staffing patterns.

On another topic, school system revenues by governmental source, the data from several sources that were available exhibited such wide variation that any analyses across States were deemed unwise. Lack of uniformity of reporting appeared responsible for some of the inconsistencies. For example, in some cases, the reported State revenues to local systems appeared to include only those funds from the principal State aid assistance program, ignoring many other items of State support. In other cases, intermediate district revenues were reported in a variety of ways. Parent governments did not always include payments to independent school systems or to independent school employee retirement systems. These and many other highly specific problems pertaining to some States need to be resolved before reasonable study of revenue sources will be possible.

In the editing process, the ELSEGIS School District Universe file served as a control against which the other files were checked for identification and complete data. A considerable amount of inconsistency in existing data bases became evident in the process of establishing a master file of school systems. All of the files merged were ostensibly universe files, with the exception of the data on teachers. These data were obtained from two sample surveys; one conducted by NCES (Fall 1969) and one conducted by the Equal Employment Opportunity Commission (Fall 1976). School system and State

estimates were generated for use in these analyses. The results shown in this report were obtained using data not available to the public because of confidentiality restrictions. Hence these results can not be recreated by other analysts.

As an initial editing check, statewide and national totals from the files of school system data in the Merged School System Data Base 1976-77 were compared with State and national totals from the State data base described earlier. The editing of fall enrollment reported by school systems is illustrative of the process followed. The sum of fall enrollment from the Census data base for the United States was 44,183,383, or 1.8 percent less that the figure of 44,992,859 contained in the State level data base, as obtained from the fall report. Fourteen States differed by more than 1.5 percent in the sum of enrollment reported to Census from that published in the fall report. Corrections to fall enrollment as well as to many other variables were entered into the file after rechecking of data sources and making contacts with State and local education agency staff. Considerable cooperation from the many persons contacted both greatly improved the quality of the data base and reduced the time that otherwise would have been necessary for data editing. As a result of this checking of fall enrollment figures it was determined that nine States were underreported and five States were overreported. In Alaska and Maine, underreporting had occurred because State-operated schools in the unorganized territory had been excluded. In Alaska and Pennsylvania, one and two school systems respectively did not have an enrollment figure on the Census report. Connecticut and Pennsylvania had not included enrollment data for regional vocational high schools. As a result of these checks, changes in enrollments were made as indicated in the summary table 7.1.

Table 7.1 Principal editing changes made to school system data from Census F-33

States	Type of Corrections and Qualifications (letters refer to footnotes below)	Number of School Systems	
		Deleted from Property Valuation Analysis	Property Valuation Changes
Alabama	a		
Alaska		1	
Arizona	b,c,d	4	
Arkansas	b		
California	b,d,e	2	
Connecticut	f	7	
Delaware	a,g,h		
District of Columbia	a		
Florida	a,h		
Georgia	a,i	1	
Idaho	a		
Illinois	e		
Indiana	b,e		
Iowa	a,g,j		10
Kansas	a	1	
Louisiana	f,h		
Maine	b		
Massachusetts	a,g	3	
Michigan	f		
Minnesota	j	2	2
Mississippi	g	1	
Missouri	b,j		
Nebraska	b,c,j	4	
New Hampshire	b		
New Jersey	f,g		
New Mexico		1	
New York	c,f,j		
North Carolina	g		
North Dakota	b	4	
Ohio	b	1	
South Carolina			2
South Dakota	b	9	
Tennessee	k	12	
Texas	b,l		
Utah			1
Vermont	b		
Washington	b,e	3	
Wisconsin	j	1	
Wyoming	c		

FOOTNOTES TO TABLE 7.1

a. Total educational expenditures for school system level of aggregation may be understated because value of school lunch commodities, debt service or capital outlay was not reported on Census Form F-33.

b. Enrollment was changed for selected school systems after consultation with State Education Agency.

c. Core current education expenditure for school system level of aggregation may be understated and differs from other states in that retirement for transportation personnel was excluded as well as transportation expenditures. Usually all retirement is reported in fixed charges and not functional categories.

d. Some school systems have been reported as unified by the Bureau of the Census and treated as unified in this report when they are in fact legally separate elementary and secondary school systems. Three such "unified" schools systems in Arizona are Catalina Foothills School Districts 16 and 116, Marana School Districts 6 and 106, and two Sierra Vista School Districts. One such "unified" school system in California includes two Porterville School Districts.

e. Census Directory enrollment was used for all school systems because no enrollment data were reported on F-33.

f. Enrollment data on F-33 were changed for all school systems from a source external to F-33 after consultation with State Education Agency.

g. Selected Vocational-Technical school systems were excluded from analysis.

h. Total educational expenditures for the school system level of aggregation may be understated because category "other current expenditures" was not reported on F-33.

i. Twenty-four school systems are included in the analysis even though both enrollment and financial data include vocational-technical programs of a post-secondary character.

j. Payments to local retirement systems were added to fixed charges and thereby expenditures, whether made by school system or city for the following city school systems: Des Moines, Minneapolis, Kansas City, St. Louis, Omaha, New York and Milwaukee.

k. Transportation expenditures for Carroll County were prorated among school systems in the county according to the ratio of school system enrollment to total county enrollment.

l. Federal funds from Public Law 815 and 874 (commonly known as impact aid) are included as local revenue.

TABLE 7.2

COMPARISON OF CORE-CURRENT EXPENDITURE PER PUPIL VALUES FROM STATE AND DISTRICT DATA BASES, BY STATE: UNITED STATES, 1976-77

STATE OR OTHER AREA	STATE DATA BASE		DIFFERENCY COL. 1 MINUS COL. 2	UNIFIED DISTRICTS FROM MERGED DATA FILE	PERCENT COL. 1 OF COL. 4	PERCENT COL. 2 OF COL. 4
	WITH STATE AND INTERMEDIATE EXPENDITURES (1)	WITHOUT STATE AND INTERMEDIATE EXPENDITURES (2)	(3)	(4)	(5)	(6)
UNITED STATES	$1380	$1290	$100	$1311	105.29	97.94
ALABAMA	961	807	154	797	120.58	100.48
ALASKA	2844	2645	199	2496	114.13	105.77
ARIZONA	1342	1228	113	1214	110.61	101.31
ARKANSAS	885	808	76	812	109.01	99.57
CALIFORNIA	1614	1495	119	1577	104.14	98.24
COLORADO	1419	1404	21	1438	91.16	97.59
CONNECTICUT	1491	1451	39	1444	107.46	100.50
DELAWARE	1586	1385	201	1381	114.48	101.79
DIST OF COLUMBIA	1913	1913	0	1914	99.98	99.94
FLORIDA	1296	1193	19	1256	94.12	95.02
GEORGIA	1269	1261	8	992	100.88	100.40
HAWAII	1537	1537	0	1549	99.47	99.97
IDAHO	991	945	36	942	104.11	100.27
ILLINOIS	1409	1336	73	1364	103.34	97.94
INDIANA	1121	1021	100	1049	106.88	97.31
IOWA	1427	1365	62	1377	103.69	97.71
KANSAS	1268	1180	84	1229	103.98	96.33
KENTUCKY	888	872	16	869	105.84	96.95
LOUISIANA	1015	961	76	968	107.38	99.42
MAINE	1048	978	71	1036	101.27	96.37
MARYLAND	1545	1405	140	1544	100.06	98.99
MASSACHUSETTS	1717	1629	87	1654	103.72	97.64
MICHIGAN	1549	1354	195	1352	114.38	100.19
MINNESOTA	1529	1403	126	1343	113.14	102.94
MISSISSIPPI	881	868	13	911	104.44	107.04
MISSOURI	1116	1109	6	1100	101.19	100.84
MONTANA	1479	1479	90	N.A.	N.A.	N.A.
NEBRASKA	1411	1342	68	1396	104.18	98.98
NEVADA	1235	1216	20	1216	101.64	100.93
NEW HAMPSHIRE	1167	1075	92	1049	112.97	107.14
NEW JERSEY	1796	1676	120	1619	110.96	101.54
NEW MEXICO	1158	1131	27	1184	97.98	95.34
NEW YORK	1837	1757	11	2210	97.46	97.17
NORTH CAROLINA	1024	946	78	1003	107.39	94.39
NORTH DAKOTA	1231	1106	14	1257	101.96	99.09
OHIO	1327	1219	8	1199	102.30	101.64
OKLAHOMA	1113	983	130	936	110.91	105.37
OREGON	1593	1521	72	1555	102.47	97.82
PENNSYLVANIA	1525	1442	114	1378	110.98	104.81
RHODE ISLAND	1472	1468	24	1466	101.98	101.71
SOUTH CAROLINA	971	842	129	845	114.94	99.63
SOUTH DAKOTA	1116	1068	29	1092	102.19	101.94
TENNESSEE	1037	920	116	891	117.40	104.61
TEXAS	1144	1047	97	1046	109.12	100.09
UTAH	1077	1048	29	1092	102.19	99.76
VERMONT	1293	1231	63	1316	97.44	93.76
VIRGINIA	1213	1134	80	1122	108.11	101.07
WASHINGTON	1441	1342	98	1361	105.79	98.62
WEST VIRGINIA	1062	1014	48	1034	102.64	98.06
WISCONSIN	1483	1464	19	1449	102.38	100.08
WYOMING	1942	1909	33	1436	100.18	109.91
PUERTO RICO	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

N.A. = NOT APPLICABLE

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATION FROM THE DISTRICT MERGED DATA FILE.

Data on expenditures were generated from two data bases, collected on the NCES Form 2350-6 and the Bureau of the Census Form F-33. In general, both reports requested information for data items that were similarly defined. However, there had been no effort to design the two studies as integrated parts of a common study. Their purposes were separate: NCES Form 2350 was designed to collect information needed by the Office of Education to establish a data base for calculating Federal aid entitlements; Census Form F-33 was designed to provide school revenue and expenditure information for local education agencies. In contrast with the Census data for local systems, the NCES survey included State, intermediate district, and local system school finance data.

The comparison of data from the two sources indicates a generally close data agreement when allowance is made for State and intermediate system expenditures that are included in the NCES form but excluded from Census data. As indicated, Census data for 41 States and the District of Columbia are within plus or minus 5 percent of the NCES figures and 7 States are between 5 and 7.5 percent of the NCES figures (table 7.2) Only 3 States, Georgia and Maryland, and New York have differences exceeding 7.5 percent. It is important to note that the difference for Georgia appears to reflect the inclusion of area vocational-technical schools with public school data (these data are not otherwise included since they are for the operation of schools apart from the elementary-secondary school systems); the difference for Maryland results from the fact that the Maryland State education agency appears to have included State expenditures in the reported local system expenditures (this appears evident from the fact that the NCES and the Census per pupil amounts are nearly identical prior to excluding expenditures by State and intermediate education agencies). The New York difference results mainly from the inclusion of New York City payments for retirement in the F-33 report.

Some expenditures by State and intermediate educational agencies were not reported on Census forms even when they were made on behalf of local educational agencies. Some States (e.g., Maryland) allocated these expenditures to local education agencies. Others, such as Rhode Island, reported no school lunch expenditures at the local level; South Carolina reported no school transportation expenditures. More often payments to retirement funds made by the State do not appear on local school system records as expenditures. Table 7.2 shows the amounts of State and intermediate expenditures per pupil by State.

The effect of these exclusions of State and intermediate expenditures from the within-State analysis on the reported results are not clear. Intermediate expenditures are small, accounting for less than 5 percent of total spending in most States. However, these expenditures when used judiciously can reduce disparities in services and offerings. Small enrollment size school systems are given the opportunity for programs at an efficient expenditure level, where these programs would likely not be offered otherwise. Moreover when the program provided is offered to all school systems at no local cost, small enrollment size school systems and less wealthy school systems are more likely to avail themselves of the programs. In this sense, intermediate system expenditures can reduce disparities. Conversely, intermediate systems can increase calculated disparities if these systems are the principal vehicle for specially funded projects. In this instance, intermediate systems may assist only a few of the component systems and increase service and spending disparities.

Direct State expenditures present an alternative opportunity to increase or decrease disparities. A uniform expenditure per pupil by school system such as Social Security payments when all teachers are paid salaries above the maximum Social Security wage level would reduce expenditure disparities as

measured by the coefficient of variation. Alternatively, the same State practice with average salary of teachers varying by school system, yet below the maximum Social Security wage level, would increase expenditure disparities as measured by the coefficient of variation.

Data on teachers at the school system level were obtained from different data bases for the two years examined in the analysis, 1969-70 and 1976-77. The NCES State data base provided State level estimates for each of the years. Table 7.3 shows the number of classroom teachers per 1,000 pupils from State data reports for all school systems and estimates for unified school systems from the national sample of school systems surveyed by EEO in 1976-77. Eleven States have ratios of pupils to teachers at the system level that are less than 85 percent of those figures from the State data base. Those States are Alabama, Arizona, California, Connecticut, Illinois, Minnesota, North Carolina, Maryland, South Carolina, Tennessee, and Virginia. For 3 of the 8 States, Arizona, California, and Illinois, the use of only unified school systems for within State analyses could explain the difference.

Effects of the Within-State Analysis Limitation to Unified Systems

The equitable handling of school systems that are dissimilar because of organizational characteristics was discussed earlier. Chapter 2 cited the problems posed in attempting to compare school systems with differing grade level organizational patterns. Per pupil instructional costs are higher for systems offering only secondary education than for those serving only elementary pupils.

Unified systems (those serving grades 1-12) may have varying per pupil costs because of their proportionate enrollments at the elementary and secondary levels. Even so, an arbitrary restriction of the analysis of dispersions in resources to those systems that are unified does remove a

TABLE 7.3

COMPARISON OF CLASSROOM TEACHERS PER 1000 PUPILS FROM STATE DATA BASE WITH NATIONAL ESTIMATES, BY STATE: UNITED STATES, 1969-70 AND 1976-77

(INCLUDES ALL PUBLIC SCHOOL PUPILS AND TEACHERS)

STATE OR OTHER AREA	1976-77 CLASSROOM TEACHERS PER 1,000 PUPILS			1969-70 CLASSROOM TEACHERS PER 1,000 PUPILS		
	STATE DATA BASE	ESTIMATED 1/	PERCENT COL. 2 OF COL. 1	STATE DATA BASE	ESTIMATED 1/	PERCENT COL. 5 OF COL. 4
	(1)	(2)	(3)	(4)	(5)	(6)
UNITED STATES	49.	43.	87.9	44.	44.	98.8
ALABAMA.....	50.	39.	79.2	41.	40.	96.7
ALASKA.....	49.	45.	90.9	44.	45.	98.6
ARIZONA.....	47.	38.	80.3	41.	0.	0.0
ARKANSAS....	47.	44.	91.8	43.	39.	91.0
CALIFORNIA..	47.	38.	82.5	41.	36.	84.5
COLORADO....	50.	45.	90.9	43.	43.	99.2
CONNECTICUT.	57.	48.	84.7	49.	49.	102.5
DELAWARE....	51.	51.	99.0	44.	45.	103.4
DIST.OF COL..	49.	48.	99.9	50.	48.	96.8
FLORIDA.....	48.	44.	91.0	43.	43.	98.0
GEORGIA.....	42.	41.	95.5	39.	39.	102.0
HAWAII.....	45.	45.	99.9	42.	41.	98.6
IDAHO.....	46.	43.	93.9	44.	42.	96.6
ILLINOIS....	49.	42.	86.9	46.	0.	0.0
INDIANA.....	46.	42.	92.9	41.	44.	106.8
IOWA.....	55.	49.	88.8	50.	48.	95.6
KANSAS.....	56.	52.	93.1	49.	50.	100.9
KENTUCKY....	47.	46.	99.1	42.	43.	102.5
LOUISIANA...	48.	41.	86.0	42.	44.	103.7
MAINE.....	53.	47.	88.8	50.	47.	93.9
MARYLAND....	50.	42.	83.3	48.	45.	94.5
MASS.....	54.	49.	91.8	49.	47.	98.3
MICHIGAN....	43.	38.	87.9	43.	41.	93.9
MINNESOTA...	52.	44.	84.3	46.	45.	96.9
MISSISSIPPI.	47.	45.	95.6	39.	42.	107.3
MISSOURI....	51.	48.	97.8	44.	44.	99.5
MONTANA.....	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA....	57.	55.	96.8	51.	46.	89.9
NEVADA.....	42.	36.	85.3	40.	39.	95.8
N.HAMPSHIRE.	55.	48.	88.1	46.	49.	106.5
NEW JERSEY..	56.	51.	90.2	47.	44.	94.8
NEW MEXICO..	45.	44.	97.2	43.	42.	98.1
NEW YORK....	57.	45.	81.5	49.	43.	88.1
N.CAROLINA..	46.	41.	92.5	43.	40.	91.3
N.DAKOTA....	58.	48.	83.7	52.	48.	93.7
OHIO.....	49.	42.	86.8	47.	0.	0.0
OKLAHOMA....	51.	45.	89.1	46.	40.	85.4
OREGON.....	50.	46.	90.6	49.	46.	92.6
PENNSYLVANIA	52.	47.	90.7	45.	44.	98.6
RHODE ISLAND	53.	48.	89.6	49.	46.	93.9
S.CAROLINA..	50.	43.	85.9	49.	39.	92.0
S.DAKOTA....	55.	48.	86.7	53.	50.	94.9
TENNESSEE...	48.	46.	96.7	39.	39.	100.2
TEXAS.....	50.	45.	88.6	42.	38.	90.8
UTAH.....	41.	36.	88.6	39.	37.	94.6
VERMONT.....	61.	54.	88.9	53.	53.	101.0
VIRGINIA....	54.	49.	92.5	44.	44.	99.8
WASHINGTON..	43.	38.	87.6	40.	41.	101.3
W.VIRGINIA..	50.	45.	90.1	42.	42.	98.7
WISCONSIN...	52.	46.	87.3	48.	44.	91.8
WYOMING.....	55.	55.	98.9	51.	51.	99.4

1/ DERIVED FROM SAMPLE FOR UNIFIED SYSTEMS ONLY.

considerable portion of the variation attributable to known factors. While this limitation restricts the coverage of the analysis, lack of acceptable methods for dealing with the problem left the limitation as the preferred alternative.

Limiting the analysis to school systems with grades from kindergarten or first grade through twelfth grade affects the coverage of the analysis for 12 states to a considerable extent. No data are provided for Montana as that state technically operated no unified school systems. Maine and Massachusetts are mainly affected in the percentage of pupils covered. A summarization of the impact of this restriction of the analysis is provided in table 7.4.

Detailed comparisons of numbers of school systems and pupils included in the within-State analyses are shown in table 7.5. The number of operating school systems and the number of unified school systems used in the analysis are listed by State. Fall enrollment reported for the State in Statistics of Public Elementary and Secondary Day Schools 1977-78 School Year (Final) is compared with the sum of fall enrollment for unified school systems used in the report.

The total amount of core expenditure for the State calculated from amounts reported in Revenue and Expenditures of State School Systems 1976-77 may be compared with the sum of core current expenditures for unified school systems used in the report. Table 7.6 gives this comparison and also lists the estimated total of classroom teachers for unified school systems used in this report, derived from the EEOC Survey of Elementary and Secondary School Staff.

Table 7.7 provides the number of operating school systems for which property valuations were obtained, by State, and the total of property valuations after numerous adjustments to obtain either assessed or equalized

Table 7.4 Scope of within-State analyses of unified systems

State	Within-State dispersion analysis limited to--				
	Less Than 50 Percent of School Systems	Less Than 92.5 Percent of Pupils	Less Than 80 Percent of Core Current Expenditures	Less Than 75 Percent of the Teachers	Less Than 75 Percent of Property Valuation
Alabama			X		
Arizona	X	X	X	X	X
California	X	X	X	X	X
Illinois	X	X	X	X	X
Maine		X			X
Massachusetts		X			
Nebraska	X	X			X
New Hampshire	X	X	X	X	X
New Jersey	X	X	X	X	X
Oregon	X	X			
Vermont	X	X	X	X	X

TABLE 7.5

COMPARISON OF GRADE 1-12 SCHOOL SYSTEMS WITH UNIVERSE OF ALL OPERATING SCHOOL SYSTEMS, BY STATES: UNITED STATES, 1976-77

STATE OR OTHER AREA	SCHOOL SYSTEMS			FALL ENROLLMENT		
	TOTAL NUMBER OF OPERATING SCHOOL SYSTEMS (1)	NUMBER OF GRADE 1-12 SCHOOL SYSTEMS (2)	PERCENT COL. 2 OF COL. 1 (3)	TOTAL ENROLLMENT, ALL SYSTEMS (4)	GRADE 1-12 SCHOOL SYSTEMS (5)	PERCENT COL. 5 OF COL. 4 (6)
UNITED STATES....	15934	10900	68.8	44306267	40417763	91.2
ALABAMA.....	127	123	96.9	752507	749133	99.6
ALASKA.....	51	29	56.9	91190	87856	96.4
ARIZONA.....	216	71	32.9	502417	274390	54.6
ARKANSAS.....	344	339	98.1	460593	458455	99.5
CALIFORNIA.....	1037	245	24.6	4380300	2925917	66.8
COLORADO.....	181	177	97.8	570000	560294	98.3
CONNECTICUT.....	165	109	66.1	635000	573472	90.3
DELAWARE.....	26	22	84.6	122273	119884	98.0
DIST OF COLUMBIA	1	1	100.0	125848	126597	100.6
FLORIDA.....	67	67	100.0	1537334	1536221	99.9
GEORGIA.....	188	184	97.9	1095142	1090666	99.6
HAWAII.....	1	1	100.0	174943	173871	99.4
IDAHO.....	115	105	91.3	200005	199227	99.6
ILLINOIS.....	1022	441	43.2	2238129	1402847	62.7
INDIANA.....	304	295	97.0	1163179	1150382	98.9
IOWA.....	449	449	100.0	605127	603141	99.7
KANSAS.....	307	307	100.0	458330	456735	99.7
KENTUCKY.....	181	176	97.2	696000	692650	99.5
LOUISIANA.....	66	66	100.0	839499	834177	99.4
MAINE.....	226	115	51.3	249522	214253	86.1
MARYLAND.....	24	24	100.0	860929	860879	100.0
MASSACHUSETTS...	357	184	51.5	1156484	977844	84.6
MICHIGAN.....	576	526	91.3	2035703	2072614	101.8
MINNESOTA.....	438	434	99.5	862581	880618	102.1
MISSISSIPPI.....	152	150	98.7	510209	499076	97.8
MISSOURI.....	556	461	81.9	950142	927241	97.6
MONTANA.....	575	N.A	N.A	170552	N.A	N.A.
NEBRASKA.....	1197	294	26.6	312024	279824	89.7
NEVADA.....	17	16	94.1	141791	141670	99.9
NEW HAMPSHIRE...	156	67	42.9	175694	144341	82.3
NEW JERSEY.....	596	203	34.6	1497000	1354447	74.0
NEW MEXICO.....	88	87	98.9	284719	274658	96.4
NEW YORK.....	736	660	89.7	3333809	3238140	97.0
NORTH CAROLINA..	145	145	100.0	1191316	1184005	100.2
NORTH DAKOTA....	317	252	79.5	129104	131145	101.6
OHIO.....	616	612	99.4	2269440	2250682	100.1
OKLAHOMA.....	623	454	72.9	597865	580592	97.1
OREGON.....	330	154	46.7	474307	402056	84.7
PENNSYLVANIA....	504	502	99.6	2193673	2079211	94.8
RHODE ISLAND....	40	29	72.5	172371	163359	94.8
SOUTH CAROLINA..	92	92	100.0	620731	617877	99.5
SOUTH DAKOTA....	187	183	97.3	148085	151135	102.1
TENNESSEE.....	147	127	86.4	841976	854316	101.7
TEXAS.....	1087	967	89.0	2822754	2795491	99.0
UTAH.....	40	40	100.0	314471	314471	100.0
VERMONT.....	248	36	14.5	104356	41693	39.9
VIRGINIA.....	135	132	97.8	1100723	1097819	99.7
WASHINGTON.....	301	247	82.1	740736	728397	98.3
WEST VIRGINIA...	55	55	100.0	404771	401035	99.1
WISCONSIN.....	436	369	84.6	945337	903273	95.6
WYOMING.....	51	43	84.3	90587	86547	95.6

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM NCESD DISTRICT FILE.

TABLE 7.6

COMPARISON OF CORE-CURRENT EDUCATION EXPENDITURE AND TEACHERS FROM STATE AND SCHOOL SYSTEM DATA BASES, BY STATE: UNITED STATES, 1976-77

STATE OR OTHER AREA	CORE-CURRENT EXPENDITURE (IN THOUSANDS OF DOLLARS)			TOTAL CLASSROOM TEACHERS		
	STATE DATA BASE (1)	GRADES 1-12 SCHOOL SYSTEMS FROM MERGED DATA FILE (2)	PERCENT COL. 2 OF COL. 1 (3)	STATE DATA BASE (4)	ESTIMATE FOR GRADES 1-12 SCHOOL SYSTEMS (5)	PERCENT COL. 5 OF COL. 4 (6)
UNITED STATES....	61120562	52973050	86.7	2185167	1758100	80.5
ALABAMA.....	723373	567098	78.4	37757	29366	78.0
ALASKA.....	261161	219338	84.0	6474	3919	87.6
ARIZONA.....	676684	333117	49.4	23482	10290	43.8
ARKANSAS.....	407551	372576	91.4	21823	19951	91.4
CALIFORNIA.....	7067921	4491548	63.0	203091	112340	55.1
COLORADO.....	806425	805948	99.9	28454	24433	89.4
CONNECTICUT	940302	927892	89.0	36797	27754	76.5
DELAWARE.....	193970	163137	84.1	8235	6954	97.1
DIST OF COLUMBIA	249770	262288	105.4	6057	6089	100.5
FLORIDA.....	1953950	1929419	104.1	73500	66826	90.9
GEORGIA.....	1144697	1037645	90.6	46654	44144	95.1
HAWAII.....	369826	271065	100.9	7814	7759	99.3
IDAHO.....	196199	187713	95.7	9274	8587	92.6
ILLINOIS.....	3152694	1913889	60.7	110494	58779	53.2
INDIANA.....	1353831	1306437	92.5	53087	48775	91.9
IOWA.....	863696	830470	96.2	33934	29694	88.5
KANSAS.....	580035	561162	96.7	25634	23522	91.8
KENTUCKY.....	623337	587774	94.3	32299	31931	95.9
LOUISIANA.....	852652	789447	92.6	40430	34539	85.6
MAINE.....	260996	222831	85.1	13330	10113	76.4
MARYLAND.....	1330084	1329239	99.9	42491	35726	83.3
MASSACHUSETTS...	1996141	1619141	81.5	62115	48208	77.6
MICHIGAN.....	3147034	2801092	89.0	88003	78544	89.3
MINNESOTA.....	1318255	1200161	91.0	45027	38460	85.9
MISSISSIPPI.....	449657	404814	90.0	26174	22556	93.5
MISSOURI.....	1059893	1020184	96.3	48563	41634	85.7
MONTANA.....	252252	0	0.0	0	0	0.0
NEBRASKA.....	460335	379430	85.2	17851	15618	89.4
NEVADA.....	175174	172290	98.3	5095	5100	89.1
NEW HAMPSHIRE...	204062	151484	76.2	9424	6976	72.5
NEW JERSEY.....	2562909	1659918	66.7	80013	53457	66.8
NEW MEXICO.....	329569	325733	98.8	12986	12043	93.5
NEW YORK.....	6469074	7156482	110.6	172116	146062	84.9
NORTH CAROLINA..	1222779	1198052	98.0	52904	49074	92.8
NORTH DAKOTA....	158962	154355	99.6	7551	6308	83.5
OHIO.....	2759343	2498784	97.8	105589	93854	88.9
OKLAHOMA.....	465333	561368	91.7	30403	26297	86.5
OREGON.....	756232	625071	82.7	23944	18334	76.6
PENNSYLVANIA....	3413626	2868[illegible]	83.8	114622	99347	86.0
RHODE ISLAND....	257244	235022	91.7	9162	7776	84.9
SOUTH CAROLINA..	602797	52[illegible]	86.6	30019	25827	83.5
SOUTH DAKOTA....	185202	159910	96.8	8164	7224	88.5
TENNESSEE.....	877731	754759	86.5	40137	34595	88.2
TEXAS.....	3227960	2924282	90.6	142409	124679	87.6
UTAH.....	339726	330833	97.7	12953	11447	88.4
VERMONT.....	133937	54844	40.9	6314	2238	35.5
VIRGINIA.....	1335410	1231992	92.3	59539	48962	82.2
WASHINGTON.....	1124881	1047304	93.1	33689	29043	86.2
WEST VIRGINIA...	638019	614716	96.7	20174	18006	89.3
WISCONSIN.....	1303113	1258795	96.6	49365	41189	83.4
WYOMING.....	139666	133451	98.4	4891	4717	96.5

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCE: U.S DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED DISTRICT FILE.

TABLE 7.7

PROPERTY VALUATIONS FOR ALL SCHOOL SYSTEMS AND SCHOOL SYSTEMS WITH GRADES 1-12 WHICH WERE USED IN REPORT, BY STATE: UNITED STATES, 1976-77

STATE OR OTHER AREA	NUMBER OF SCHOOL SYSTEMS			PROPERTY VALUE		
	TOTAL ADJUSTED1/ SYSTEMS GRADES 1-12 (1)	TOTAL SYSTEMS GRADES 1-12 (2)	PERCENT COL. 2 OF COL. 1 (3)	TOTAL ADJUSTED (4)	TOTAL (5)	PERCENT COL. 5 OF COL. 4 (6)
UNITED STATES	15822	10813	68.34	2394803	2086485	90.77
ALABAMA	127	121	96.85	7113	7043	99.02
ALASKA	36	27	90.00	7038	6756	96.12
ARIZONA	239	70	29.29	9799	3459	35.24
ARKANSAS	385	369	95.84	18078	17942	99.26
CALIFORNIA	1041	254	24.40	121664	63960	52.49
COLORADO	181	177	97.79	8435	8421	99.83
CONNECTICUT	158	109	68.99	52012	49348	93.03
DELAWARE 3/	26	22	84.62	7885	3913	49.75
DIST OF COLUMBIA	1	1	100.00	8658	8658	100.00
FLORIDA	67	67	100.00	101369	101369	100.00
GEORGIA	188	184	97.87	79054	78938	99.73
HAWAII	1	1	100.00	11639	11639	100.00
IDAHO	118	105	91.38	11716	11548	98.67
ILLINOIS	1016	436	42.91	67602	22598	33.53
INDIANA	304	295	97.04	43153	42993	99.62
IOWA	449	449	100.00	43201	43220	100.41
KANSAS	306	306	100.00	36926	36926	100.00
KENTUCKY	181	176	97.24	36319	36248	99.81
LOUISIANA	66	66	100.00	22187	22187	100.00
MAINE	279	114	40.86	11713	9742	83.17
MARYLAND	24	24	100.00	48314	48314	100.00
MASSACHUSETTS	349	177	50.72	63081	52370	83.02
MICHIGAN	591	526	93.51	113590	112852	99.36
MINNESOTA	440	436	99.09	49321	52792	107.03
MISSISSIPPI	152	150	98.68	4382	4334	98.91
MISSOURI	550	451	80.82	56639	55048	97.53
MONTANA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA	1110	292	26.19	7505	5509	73.41
NEVADA	17	16	94.12	10610	10571	99.64
NEW HAMPSHIRE	163	87	61.10	11135	8125	73.03
NEW JERSEY	534	383	38.01	100148	74612	68.81
NEW MEXICO	88	87	98.86	6152	6145	99.88
NEW YORK	722	669	91.41	207235	197213	95.16
NORTH CAROLINA	133	133	100.00	4449	44691	100.00
NORTH DAKOTA	364	252	73.24	1471	1380	93.78
OHIO	616	613	99.35	204496	204352	99.97
OKLAHOMA	623	456	72.87	44712	44184	94.42
OREGON	334	156	46.11	39967	31155	77.95
PENNSYLVANIA	503	500	99.40	76913	76863	99.95
RHODE ISLAND	38	29	76.32	11463	10698	93.34
SOUTH CAROLINA	92	92	100.00	2012	2012	100.00
SOUTH DAKOTA	194	181	93.30	17627	17398	98.19
TENNESSEE	147	127	86.39	12239	11877	97.04
TEXAS	1095	963	87.95	337648	327155	97.64
UTAH	40	40	100.00	3237	3237	100.00
VERMONT	240	36	15.17	7047	2304	32.69
VIRGINIA	141	132	93.62	80028	78695	98.33
WASHINGTON	303	247	81.52	60610	59146	97.58
WEST VIRGINIA	55	55	100.00	15452	15452	100.00
WISCONSIN	395	335	83.54	52133	45818	87.87
WYOMING	49	41	83.67	3447	3323	93.43
PUERTO RICO	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

1/ REPRESENTS SCHOOL SYSTEM AND PROPERTY VALUATION DATA OBTAINED FROM "DATA ON LOCAL PROPERTY WEALTH FOR SCHOOL YEAR 1976-77" WITH ADDITIONS MADE FOR THE DISTRICT OF COLUMBIA; HAWAII; CHICAGO, ILLINOIS; AND SELECTED CITIES IN WISCONSIN.

3/ TOTAL ADJUSTED VALUE FOR DELAWARE REPRESENTS A DOUBLE COUNTING OF PROPERTY VALUES; ONCE FOR PRIVATE SYSTEMS AND ONCE FOR VOCATIONAL-TECHNICAL SCHOOLS.

SOURCE: U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM MERGED DISTRICT FILE.

values across States 3/. Finally, State totals of property valuations adjusted for this analysis are compared with property valuations that were obtained for unified systems only.

Data on property valuation per pupil for all systems were subject to many problems. Because of their importance to the topics considered in the analysis, available data were used, even though several adjustments had to be made to provide even roughly comparable figures. The extent of variation in available data bases is indicated by table 7.8, which compares adjusted values used in this analysis with those adjusted figures reported in Data on Local Property Wealth for School Year 1976-77 and with an NCES estimate of full value based on Census-collected data on property values. While the figures from column 4 of table 7.7 are those used by States for making allotments of State funds, comparison across States is often inappropriate because the years in which the data were collected may differ, definitions may not be identical, and editing procedures used by the States may vary.

A metropolitan status code was entered on the master file to permit inspection for possible differences attributable to metropolitan characteristics. This code, designated as a population metro code, was calculated based on the population of the school system. The Special Tabulations of Census Data yielded three counts for each system: rural population, central city population, and other population. Depending on the location of a system, one or more of these variables could be zero. Population metro codes were assigned according to the following rules:

central city - If a system has a population greater than the sum of rural and other populations.

other - If the rural population is less than the sum of the central city and other populations, and other population is greater than central city population.

rural - If the rural population is greater than the sum of the central city and other population.

TABLE 7.8

COMPARISON OF PROPERTY VALUATION PER PUPIL FOR ALL DISTRICTS WITH PROPERTY VALUATION PER PUPIL FOR UNIFIED DISTRICTS USED IN THE REPORT, BY STATE: UNITED STATES, 1976-77

(INCLUDES ALL SCHOOL SYSTEMS)

STATE OR OTHER AREA	ESTIMATED FULL VALUE OF PROPERTY PER PUPIL (1)	ASSESSED VALUATION PER PUPIL (2)	PROPERTY VALUATION PER PUPIL USED IN REPORT (3)	PERCENT COL. 3 OF COL. 2 (4)	PERCENT COL. 3 OF COL. 1 (5)
UNITED STATES...	129204	39338	53076	99.36	44.16
ALABAMA.....	73073	7892	9457	83.94	12.97
ALASKA.....	155675	106614	87025	120.21	55.90
ARIZONA.....	307437	36760	12651	191.03	4.10
ARKANSAS.....	87135	7496	38118	19.16	44.99
CALIFORNIA.....	166319	28496	21884	130.72	13.16
COLORADO.....	107433	18869	15037	125.07	13.99
CONNECTICUT....	107689	65137	84195	53.73	78.16
DELAWARE.....	85898	27451	32644	83.95	38.00
DIST OF COLUMBIA	100582	68396	68396	100.00	68.00
FLORIDA.....	109597	65101	65984	98.66	60.21
GEORGIA.....	75983	73473	72297	32.37	95.15
HAWAII.....	111158	96198	66969	94.75	91.46
IDAHO.....	92776	8463	58026	14.55	62.54
ILLINOIS.....	159276	41199	25679	164.22	16.13
INDIANA.....	84764	17962	37371	33.56	44.10
IOWA.....	106835	76601	69969	106.69	65.67
KANSAS.....	106035	17982	81219	22.12	59.62
KENTUCKY.....	71329	51951	52333	98.12	73.39
LOUISIANA.....	71829	6819	26597	25.64	37.45
MAINE.....	74449	39861	45626	87.32	61.27
MARYLAND.....	91184	33306	56137	59.45	61.56
MASS.....	84827	35882	54449	65.90	64.19
MICHIGAN.....	85916	26762	54454	49.15	62.61
MINNESOTA.....	73983	19950	55969	34.61	75.68
MISSISSIPPI....	56376	5693	8695	62.31	19.43
MISSOURI.....	98956	19436	59483	26.15	60.43
MONTANA.....	N.A.	N.A.	N.A.	N.A.	N.A.
NEBRASKA.....	121925	22511	19714	114.17	16.39
NEVADA.....	129235	39909	76619	51.52	57.98
NEW HAMPSHIRE..	86873	51139	98269	90.88	66.91
NEW JERSEY.....	109980	76366	70435	105.55	64.04
NEW MEXICO.....	69184	11017	23377	52.91	33.98
NEW YORK.....	89664	24389	60902	60.05	67.93
NORTH CAROLINA.	85337	56276	56579	95.03	66.30
NORTH DAKOTA...	86169	5612	10521	53.34	12.19
OHIO.....	98068	36773	90796	39.49	92.68
OKLAHOMA.....	86515	8565	75876	11.27	87.82
OREGON.....	173616	89186	77688	114.56	67.69
PENNSYLVANIA...	67717	13121	37921	32.74	56.67
RHODE ISLAND...	95589	37452	65494	57.11	76.52
SOUTH CAROLINA.	97948	3232	3254	99.29	3.32
SOUTH DAKOTA...	101988	26109	92119	31.79	89.52
TENNESSEE.....	82156	13389	13876	95.96	16.88
TEXAS.....	364249	90295	81369	61.79	22.33
UTAH.....	77894	10917	10169	108.54	13.03
VERMONT.....	107788	99689	97972	103.68	39.67
VIRGINIA.....	87547	29715	71684	41.96	81.68
WASHINGTON.....	101855	66675	76980	86.61	74.17
WEST VIRGINIA..	87296	22173	38579	57.45	44.14
WISCONSIN.....	99881	63909	69791	62.77	70.54
WYOMING.....	283451	39429	27619	193.68	9.74
PUERTO RICO....	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: SEE GLOSSARY FOR DEFINITIONS OF TERMS.

SOURCES:

FOR COLUMN (1): "ESTIMATES BASED ON ASSESSED VALUE OF PROPERTY SUBJECT TO LOCAL GENERAL PROPERTY TAXATION FROM TABLE 3, ADJUSTED BY STATE SIZE-WEIGHTED AVERAGE OF ASSESSED-TO-SALES PRICES FOR ALL TYPES OF PROPERTY AS PUBLISHED IN TABLE 9, VOLUME 3, 'TAXABLE PROPERTY VALUES AND ASSESSMENT/SALES PRICE RATIOS,' 1977, CENSUS OF GOVERNMENTS, U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, GOVERNMENTS DIVISION.

FOR ALL OTHER COLUMNS:

U.S. DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS, SPECIAL TABULATIONS FROM THE DISTRICT UNIVERSE-DATA FILE.

Since population data were not available for systems with less than 300 enrollment, this calculation could not be accomplished for those systems.

Relationships Between the Two Data Bases

Both the State level and the school system level data bases have been used in the analyses and results from both are included in this report. The restriction of the within-State analysis to unified systems and the differences in resources reported at the State and system levels have the effect of introducing several differences which are evident in the presentation of summary statistics. The differences in the values of the principal variables for the two data bases at the State level have already been summarized in tables 7.2, 7.5 and 7.6. Since both data bases are used in the generation of the statistics, both the nomenclature and the summary values for the various averages used should be reviewed. Table 7.9 compares averages computed from both data bases, showing also the effects of weighting system (and, in some cases, State) average values by the numbers of observations before computing weighted averages. The terminology shown in table 7.9 is used consistently throughout the report.

Table 7.9 Core current expenditure per pupil; definitions and values using alternative computations

Item	State data base (all pupils and all expenditures for all school systems)		School system data base (pupils and expenditures for school systems with grades 1-12 only)				
	State Averages		State Averages		State means of district means		Unweighted
	Weighted by State enrollment	Unweighted	Weighted by State enrollment	Unweighted	Weighted by State enrollment	Unweighted	
1	2	3	4	5	6	7	8
United States mean value (definition)	$1,380 C_{us}	$1,336 M_{us}	$1,311 C_{us}	$1,259 M_{us}	$1,263 K_{us}	$1,277 L_{us}	$1,245 J_{us}
Coefficient of variation (Standard deviation ÷ mean)(x100)	21.4	25.5	23.5	25.7	26.5	31.3	34.1
Distribution values — by number of State pupils							by Nation's pupils
(definition)	$(\bar{C}_i)$		$(\bar{C}_i)$		$(\bar{Y}_i)$		C_i
Low	$881		$757		$743		$512
5th percentile	961		786		845		762
50th percentile	1409		1211		1352		1237
95th percentile	1937		2004		2210		2192
High	2864		2496		3230		6898
Distribution values — by number of States							by number of U.S. school districts
(definition)		$(\bar{C}_j)$		$(\bar{C}_j)$		$(\bar{Y}_j)$	C_i
Low		$881		$757		$743	$512
5th percentile		961		845		798	743
50th percentile		1266		1226		1244	1173
95th percentile		1913		1914		1914	1983
High		2864		2496		3230	6898
Ratio of distribution values by number of States to value by number of State pupils							
(definition)	(Col. 3 ÷ Col. 2)		(Col. 5 ÷ Col. 4)		(Col. 7 ÷ Col. 6)		(Col. 8 ÷ Col. 8)
Low	100		100		100		100
5th percentile	100		108		94		98
50th percentile	90		101		92		95
95th percentile	98		96		87		90
High	100		100		100		100

Table 7.9 Notation

X_i = Core current expenditure in "i"th school system

E_i = enrollment in "i"th school system

C_i = (X_i/E_i) = core current expenditure per pupil in "i"th school system

i=1...d = number of school systems in a State

D_j = number of school systems in the "j"th State

$H_j = \sum_{i=1}^{d} X_i$ = core current expenditures in the "j"th State

$G_j = \sum_{i=1}^{d} E_i$ = enrollment in the "j"th State

$\bar{C}_j = \frac{\sum_{i=1}^{d} X_i}{\sum_{i=1}^{d} E_i} = (H_j/G_j)$ = State average expenditure per pupil for the "j"th State

Alternatively:

$\bar{C}_j = \frac{\sum_{i=1}^{d} E_i C_i}{\sum_{i=1}^{d} E_i}$ = weighted State average expenditure per pupil for the "j"th State

$\bar{F}_j = \frac{\sum_{i=1}^{d} C_i}{D_j}$ = unweighted State average of district expenditure per pupil for "j"th State.

$$\sum_{j=1}^{s}\sum_{i=1}^{d} X_{ij} = \sum_{j=1}^{s} H_j$$ = core current expenditures in the United States

$$\sum_{j=1}^{s}\sum_{j=1}^{d} E_{ij} = \sum_{j=1}^{s} G_j$$ = enrollment in the United States

$j=1...s$ = individual States and the District of Columbia

$s = 50$ = number of States and the District of Columbia

$$\bar{C}_{us} = \frac{\sum_{j=1}^{s}\sum_{i=1}^{d} X_{ij}}{\sum_{j=1}^{s}\sum_{i=1}^{d} E_{ij}}$$ = United States average core current expenditure per pupil

Alternatively:

$$\bar{C}_{us} = \frac{\sum_{j=1}^{s} G_j\bar{C}_j}{\sum_{j=1}^{s}\sum_{i=1}^{d} E_{ij}} = \frac{\sum_{j=1}^{s} G_j\bar{C}_j}{\sum_{j=1}^{s} G_j}$$ = United States weighted average expenditure per pupil

$$\bar{\bar{X}}_{us} = \frac{\sum_{j=1}^{s} \bar{C}_j}{S}$$ = United States average of State average expenditure per pupil

$$\bar{J}_{us} = \frac{\sum_{j=1}^{s}\sum_{i=1}^{d} C_{ij}}{\sum_{j=1}^{s} D_j}$$ = United States average of district average expenditure per pupil

$$\bar{K}_{us} = \frac{\sum_{j=1}^{s} G_j \bar{F}_j}{\sum_{j=1}^{s} \sum_{i=1}^{d} E_{ij}} = \frac{\sum_{j=1}^{s} G_j \bar{F}_j}{\sum_{j=1}^{s} G_j}$$ = United States weighted average of State average of district average expenditure per pupil

$$\bar{L}_{us} = \frac{\sum_{j=1}^{s} \bar{F}_j}{S}$$ = United States average of State average of district average expenditure per pupil

Chapter 7 Footnotes

1/ The computer tape available for purchase as a result of this project does not contain data identical in all instances to the data base described here. In addition, the tape includes data on variables not used in this analysis. Tape documentation should be consulted for details.

2/ National Center for Economic Alternatives, "Living Cost Differences Shift Income Ranking of States, Study Shows, "Washington, D.C., January 7, 1979, and unpublished technical notes from NCEA.

3/ These adjustment are specified in Data on Local Property Wealth School Year 1976-77, prepared for HEW by J.N. Killalea, Killalea Associates, Inc.

Chapter 8

An Agenda for Additional Analysis

In carrying out the twofold responsibility deriving from the legislative mandate for this study of school finance issues, to present data and statistical analyses and to derive appropriate measures of disparity, the Center was constrained in several ways. Lack of comparable data, limitations of available statistical measures, and, in some cases, imprecise conceptualizations of motivating issues each affected the study. These factors have been noted throughout the text. This discussion identifies several topics that offer promising areas for further research, based on this study.

As a context for this chapter, it is useful to consider the focus of the study and its influence on the choice of analyses. The study examined the distribution of variables among pupils and took as a standard equal distribution of a variable among pupils. To facilitate comparisons over time, across States, and among different variables, and to decompose the variation among mutually exhaustive categories such as among and within States, among and within school system enrollment size groupings, or among and within metropolitan status of school systems, a class of statistical measures that permitted such analysis were chosen. The power of the Theil coefficient for such analysis was noted. The intent was to give a national perspective on disparity from a comparable data base. The effort proved most successful in terms of core current expenditure per pupil and least successful in terms of property valuations per pupil.

In place of emphasizing this comprehensive national perspective, several alternative objectives could have been addressed. These alternative objectives in many cases could add to the national perspective. For example, Theil or Gini coefficients or the coefficient of variation for State expenditure disparity

could be tested for relationships to attributes of the State such as enrollment size of school, or component shares of total support. This attempt need not be statistical through use of regression or similar analysis; alternatively, one might group States by common characteristics to explain observed differences. These additional analyses were not pursued here in order to highlight the principal findings on disparities and their magnitude.

The alternative objectives for comprehensive studies comprise a research agenda. First, analyses could seek out organizational or fiscal characteristics that explain observed differences. For example, States with county unit districts may differ in particular ways from other States. Funding systems may also influence the nature of observed disparity. Second, demographic features such as metropolitan status or population characteristics could be examined for similarly explanatory characteristics. Third, States could be considered against some established standard. Court tests of school finance systems that examine wealth neutrality encourage this stance. Fourth, a State's values and distributions of some variables might be compared with those of other variables or the same variables over time. That is, dispersions in property values may be compared against computational tax rates and expenditure or teacher disparity, or examined for changes over time. Fifth, States might be compared against each other. Rankings or groupings of States according to observed dispersions serves this objective.

While the goal of this analysis has been to present a comprehensive picture of the variation in educational resources and support, several of the alternative objectives were considered to some extent. The motivation for showing the variety of presentations was pragmatic. As the first in a new series, this analysis is a benchmark, showing both the range and limits of studies possible at this time. Future reports will be more focused, as data permit and as discussion of the issues and possible studies yield consensus as to preferred approaches. Thus in an exploratory approach, the discussion of expenditure disparities considered,

to some extent, each of the alternative study objectives cited above in addition to offering statistics that described and decomposed disparity. The presentation of wealth neutrality was much less comprehensive, however, as data limitations precluded the discussion of variations computed on comparable data nationwide. Some of the alternative objectives were addessed because they had less stringent data requirements. State values were presented for some statistics that have been proposed as standards. Each State's values for several variables were used in pairwise comparisons. Values were not examined in relation to funding systems or demographic contexts. States were not compared with one another because of problems with data comparability.

An agenda for additional analysis may be formulated in terms of the five possible alternative perspectives for school finance studies by noting where the present study was hampered by data or methodological limitations. First, however, it may be observed that some possible analyses were not performed because of limitations in time or resources.

Analyses of Existing Data

The analyses presented here are not exhaustive of the information obtainable from the assembled composite data bases. Additional study is possible for several topics related to the alternative objectives.

For example, the illustrative application of weighting data to compensate for additional cost of pupils with special needs yielded little effect. More precise information on differential costs might show increasing dispersion. While refinements in the magnitude of actual cost differentials could be useful, it would be even more productive to establish the sensitivity of calculated results to changes in weightings. Many alternatives could be readily considered and tested using available information.

Similarly, the analysis of expenditures could be refined by partitioning

current expenditures into a teacher salary component and an other-than-salary expenditure component. Teacher salaries account for a large portion of instructional expenditures. Accordingly, teacher salary differences attributable to more general cost of living differentials have a major impact on expenditures but less impact on the actual instruction provided to students. In comparison, non-teacher expenditures contributing to instruction, such as textbooks, equipment, supplies, are less likely to be subject to local cost differences. Differences in expenditures on these items are more apt to portray real differences in instruction. Correcting the portion of instructional expenditures assignable to teacher salaries would therefore provide an important factor toward explaining expenditure differences, more accurate than that obtained by a flat across-the-board adjustment. Such an adjustment is possible, with data now available.

Data on teachers and pupils for elementary and secondary schools were not available for 1976-77, but they are available for later years. Use of such data to establish national norms would permit further standardizing of expenditure per pupil. Employing these data would also permit inclusion of all school systems in a State in analyses of disparities, thereby removing the limitation of analyses to school systems offering grades one through twelve.

Data Needs

A major task necessary in order to address the objectives of the study was the preparation of a comparable data base nationwide. Even assuming the ready availability of accurate data, differences in categorization or treatment of components of expenditure or support variables make it necessary to standardize definitions. The designation of core current education expenditure reflects an attempt at standardization, defining types of expenditures for inclusion and exclusion. Differences across jurisdictions in the treatment of such functions as teacher retirement funds, transportation, school lunch, textbooks, or capital

outlay leave many problems in the preparation of data bases. Despite the efforts reflected here, data are not always strictly comparable. Additional refinements to the data base would improve the precision of the analyses, especially when attempting to examine variation among States.

The list of useful analyses that are not feasible presently due to lack of data is extensive. While improvements in data quality or comparability would serve the presentation of a national perspective, other studies, particularly several pursuing the alternative objectives, are not now possible.

Several aspects of within-State expenditure dispersions need further study. The existence and magnitude of cost of living differences within States should be ascertained systematically. Such corrections are not possible now. The impact of these differences on observed values has been noted in considering among State disparities. Differences within States could also be sizeable.

The unit of the most detailed analysis of expenditure disparity in this study is the school system. Detail to the level of the school or even the classroom would permit study of disparities which could conceivably be as great as the cross-system or cross-State differences reviewed here. More detailed study of the services received by classes of pupils would also be worthwhile if data on these populations were available. The gross aggregates now available may be so closely related to other demographic factors that results are misleading.

Available data do not permit comprehensive study of wealth neutrality issues. Data on property values must be improved. Yet the task of securing comparable data nationwide is immense, and perhaps so costly that alternative study designs would be preferable. It could be necessary to obtain property values for several years simply to study a single year. Studies might require property values which provide the bases on which local taxes are raised and

State aid is calculated. Where budgeting requires funds on hand, a third year's data might be necessary to match this year's expenditures. Given existing funding systems, these (possibly different) values could be needed for more than one year simply to trace sources of funds for a single school year.

Dealing with data deficiencies may be handled by efforts to standardize data, but limited analyses may offer equally promising means of addressing underlying questions, at less cost and with fewer political problems. Transformations of data to simulate "corrections" for cost of living, for needs of special groups, or inclusions and exclusions of particular categories in existing data would reveal the sensitivity of results to such data improvements.

A program of more extensive analysis should be linked to data availability. Major census data collections are important sources of data. The census of governments, conducted in years ending in two or seven, provides comparable property values at county level to a comparable standard of full value. School system finances can be compared with total State and local finances for those years. The decennial census of population permits the study of numerous populations subgroups, facilitating more detailed study of demographic factors on those years.

Methodological Issues

The study has been productive in responding to the need for establishing informative measures for addressing equity issues. The Theil coefficient for measuring disparities in distributions of resources is offered here as a sound advance for the state of the art. Elasticities may prove to offer a preferred measure of wealth neutrality, though considerable study of this measure is still needed. Yet this study does not exhaustively test these measures, either to fully explain their properties in the context of school finance or to identify all possible useful applications of them.

Glossary

Average daily attendance (ADA) — The aggregate number of pupil days in attendance divided by the number of days in the school session. In this report, ADA is determined in accordance with State law, except that the ADA for education beyond grade 12 and for adult education is excluded, as are pupils for whom tuition payments are received from patrons. ADA (in full-time equivalence) includes pupils involved in summer schools where summer school expenditures are included in free public education.

Average daily membership — The aggregate days in membership during the school year divided by the number of days school was in session during this period.

Classroom teacher — A professional person employed full time to instruct pupils in a situation where the teacher and the pupils are in the presence of each other. Classroom teachers exclude librarians or other professional instructional personnel.

Coefficient of variation -- The standard deviation of a distribution divided by the arithmetic mean. It usually is expressed as a percent and thus, as in this report, it is multiplied by 100. The coefficient of variation is equally sensitive to transfers among districts at all levels of the variable.

Cost-of-living adjustment -- An index of the relative cost-of-living between States. This measure was developed by the National Center for Economic Alternatives, a private research organization, and is an attempt to provide some indication of the degree to which differences in income may be modified if living cost differences are taken into consideration.

Education expenditures, core current -- Includes current expenditures for instruction, administration, fixed charges, maintenance and operation, and attendance and health services.

Education expenditures, total -- Includes core current expenditures plus expenditures for pupil transportation, net expenditures for food services and pupil activities, expenditures for community services, capital outlay, and interest payments, but excludes expenditures from income received from sales and charges.

Fifth (5th) percentile -- The value in an array below which lies 5 percent of the units in the array. Generally, in this report, this is the value of a measure for the school system in which the 5th percentile of pupils is located when the measure is arrayed from low to high.

Gini coefficient — The sum of the absolute differences between all possible pairs of observations divided by twice the mean. The Gini coefficient often is associated with the Lorenz curve (i.e., the joint cumulative frequency distribution of the individuals and the resources) and is equal to the area between the Lorenz curve and the line of perfect equality divided by total area of the triangle. The Gini coefficient tends to be most sensitive to transfers among districts around the middle of the distribution. It is multiplied by 100 in this report.

Mean -- The result of dividing the sum of individual values in an array by the number of items in the array. Generally, arrays over States and for the nation are arrays of pupils, so the mean is determined by summing the item, over pupils, and dividing by the total number of pupils.

Ninety-fifth (95th) percentile — The value in an array below which lies 95 percent of the units in the array. Generally, in this report, this is the value of a measure for the school system in which the 95th percentile of pupils is located when the measure is arrayed from low to high.

Property valuation, assessed — Usually, the value of property offically determined for taxation purposes.

Property valuation, State equalized — The assessed valuation of property converted to a common Statewide standard, usually some percentage of full or fair market value.

Pupils — Pupil membership as of October 1, or nearest date thereto, for grade per kindergarten through 12.

Revenue, federal -- All federal funds for State and intermediate administration and for local school systems, whether going directly to them or through the State as a distribution agency.

Revenue, local -- For purposes of this report, all revenue produced by the school district and available to the district in the amount produced plus all funds collected by an intermediate administrative unit, a political subdivision between school districts and the State, and used for public elementary and secondary school purposes. Excludes receipts from sale of bonds, loans, sale of school property and insurance adjustments and income from transfer accounts.

Revenue receipts — Additions to assets which do not incur an obligation to be met at some future date, do not represent exchanges of property for money, and are available for expenditure. State contributions to retirement systems, pension funds, and social security are included. Money that supports or aids in expenditures for vocational rehabilitation and salaries of personnel for supplementary services such as State libraries and State museums, teacher retirement, teacher placements, etc., are not included.

Revenue, State — Revenue from the State for operation of the State board and State department of education and all funds collected by the State and distributed to intermediate and local units. Excludes moneys that support or aid in expenditures for vocational rehabilitation and salaries of personnel for supplementary services such as State libraries and State museums, teacher retirement, teacher placement, etc.

School system (also may be referred to as school district) — synonymous with local basic administrative unit. An administrative unit at the local level which exists primarily to operate public schools or to contract for public school purposes. These units may or may not be coterminous with county, city, or town boundaries.

Theil coefficient — Theil's measure of inequality is based on an information theory approach. Subtracting the entropy (i.e., disorder) of a distribution from its maximum value gives Theil's measure of inequality. The Theil coefficient is more sensitive to transfers among districts at the lower end of the distribution. It is multiplied by 1,000 in this report.

Unified school district -- A school district that encompasses all grade levels between kindergarten or first grade and twelfth grade.

APPENDIX

FORMULAS FOR THE STATISTICAL PROCEDURES OF THE MEASURES OF DISPARITIES IN EDUCATION RESOURCES AND FROM WEALTH NEUTRALITY

The following definitions are used in the formulas for the statistical procedures of the disparity and wealth neutrality measures:

N = number of units (e.g., of States or school districts)

i,j = units of analysis (e.g., State or school district); $i=1,\ldots,N$; $j=1,\ldots,N$

X,Y = factor of interest (e.g., core current expenditures per pupil, teacher-pupil ratio, etc.)

X_i or Y_i = level of factor in unit i; $i=1,\ldots,N$

P_i = pupils or enrollment in unit i

The following formulas were used:

1. <u>95:5 percentile ratio</u>: value at 95th percentile/value at 5th percentile of a distribution ranked from low to high.

2. <u>Mean value</u>:

$$\bar{X}_d = \frac{\sum_{i=1}^{N} X_i}{N}$$

$$\bar{X}_p = \frac{\sum_{i=1}^{N} P_i X_i}{\sum_{i=1}^{N} P_i}, \text{ weighted by pupils.}$$

3. Coefficient of variation:

$$CV = \frac{\sqrt{\sum_{i=1}^{N} P_i (X_i - \bar{X})^2 / \sum_{i=1}^{N} P_i}}{\bar{X}_p}$$

4. Gini coefficient:

$$G = \frac{1/2 \left[1/\left(\sum_{i=1}^{N} P_i\right)^2\right] \sum_{i=1}^{N} \sum_{j=1}^{N} \left(|X_i - X_j| P_i P_j\right)}{\bar{X}_p}$$

5. Theil coefficient:

$$T = \frac{\sum_{i=1}^{N} P_i X_i \ln X_i - \sum_{i=1}^{N} P_i X_i \ln \mu}{\sum P_i X_i}$$

6.

$$r_w = \frac{\sum_{i=1}^{N} P_i (X_i - \bar{X})(Y_i - \bar{Y}) / \sum_{i=1}^{N} P_i}{\sqrt{\sum_{i=1}^{N} P_i (X_i - \bar{X})^2 / \sum_{i=1}^{N} P_i} \sqrt{\sum_{i=1}^{N} P_i (Y_i - \bar{Y})^2 / \sum_{i=1}^{N} P_i}}$$

7.

$$R_i = a + bW_i$$

$$\ln R_i = a + b(\ln W_i)$$

Where R = State and local revenues

W = Property valuations